# THE JOURNAL OF GAS LIGHTING
## WATER SUPPLY & SANITARY IMPROVEMENT

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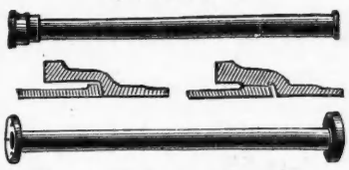

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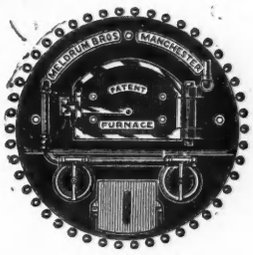


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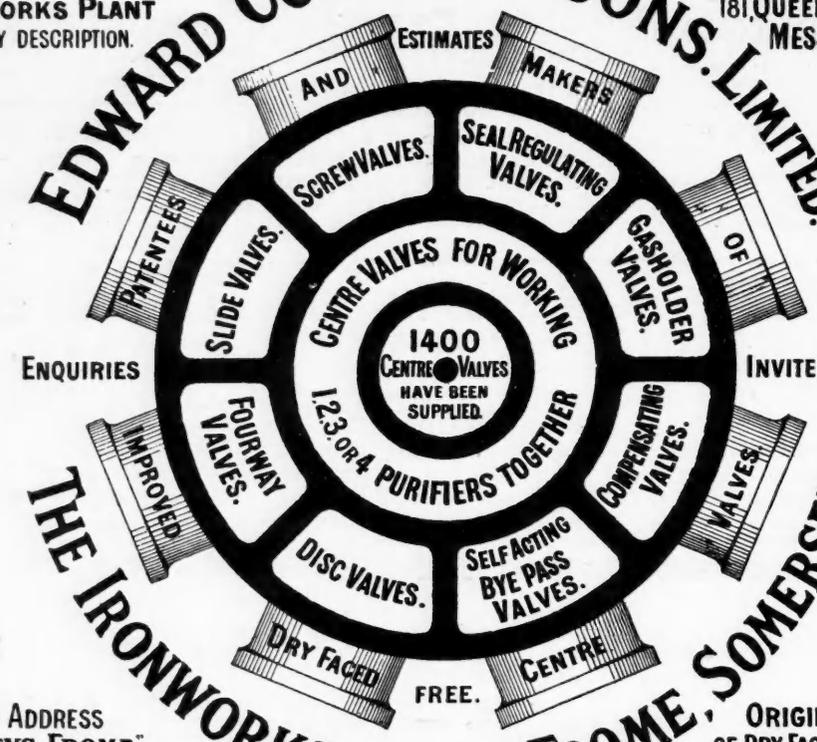


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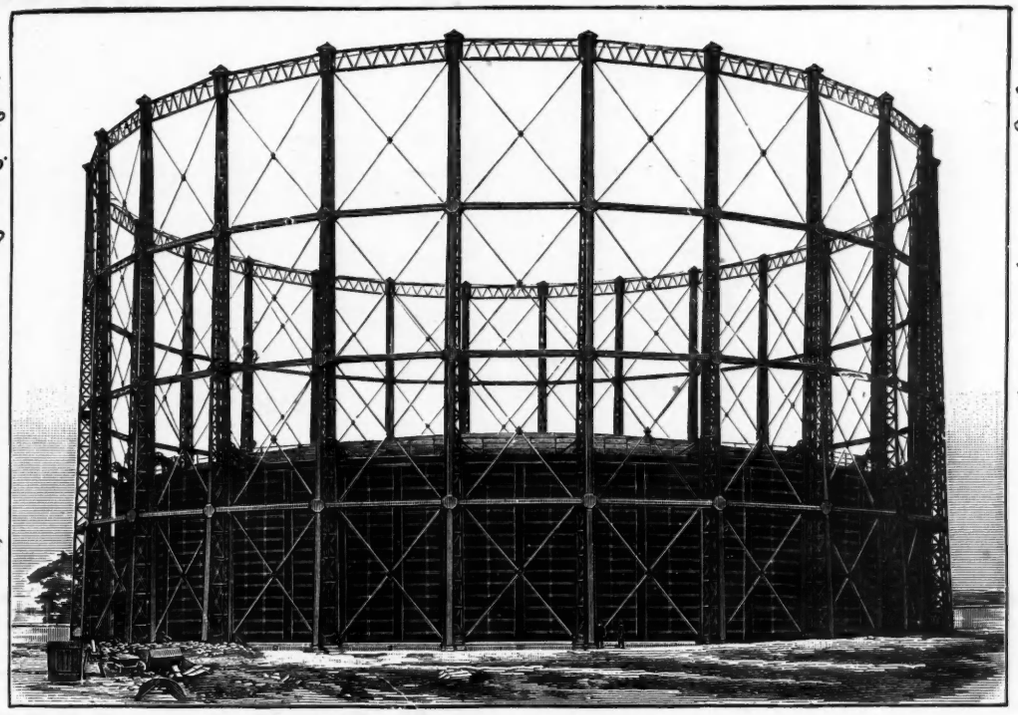

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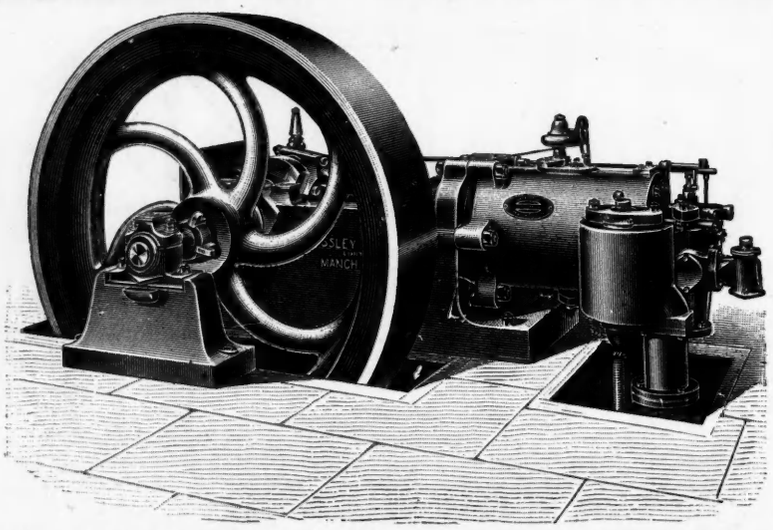

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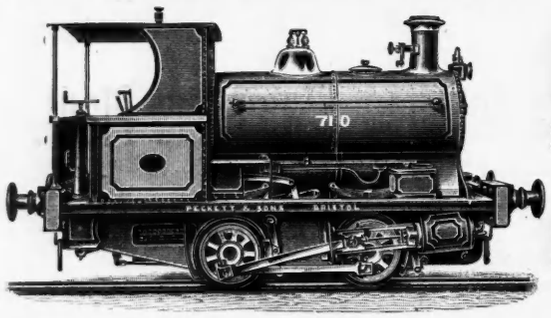

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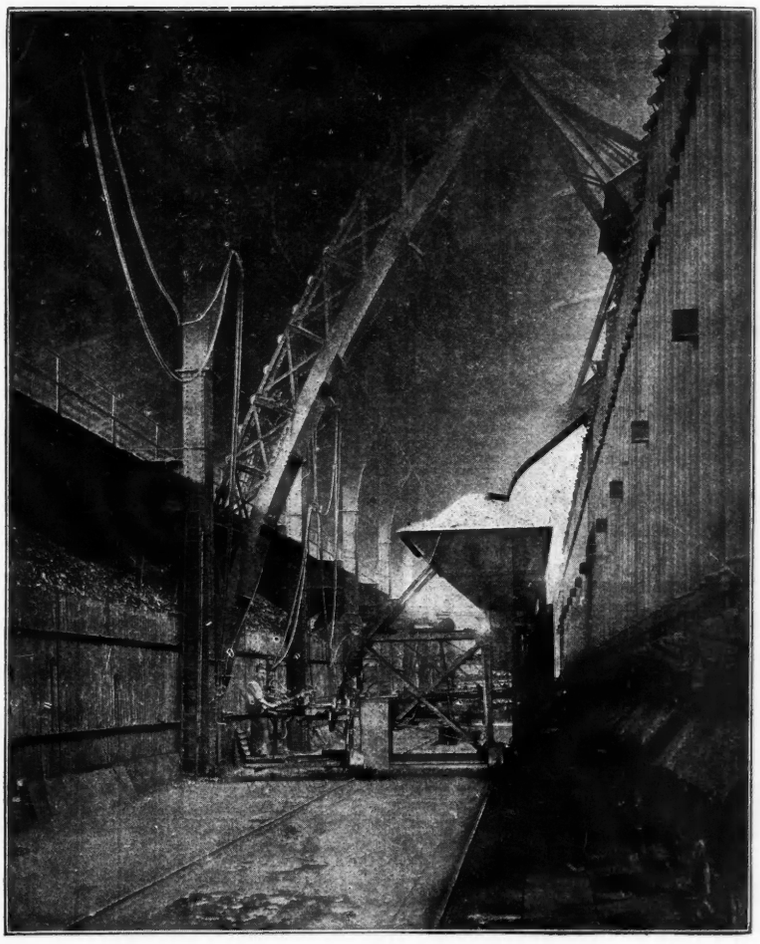

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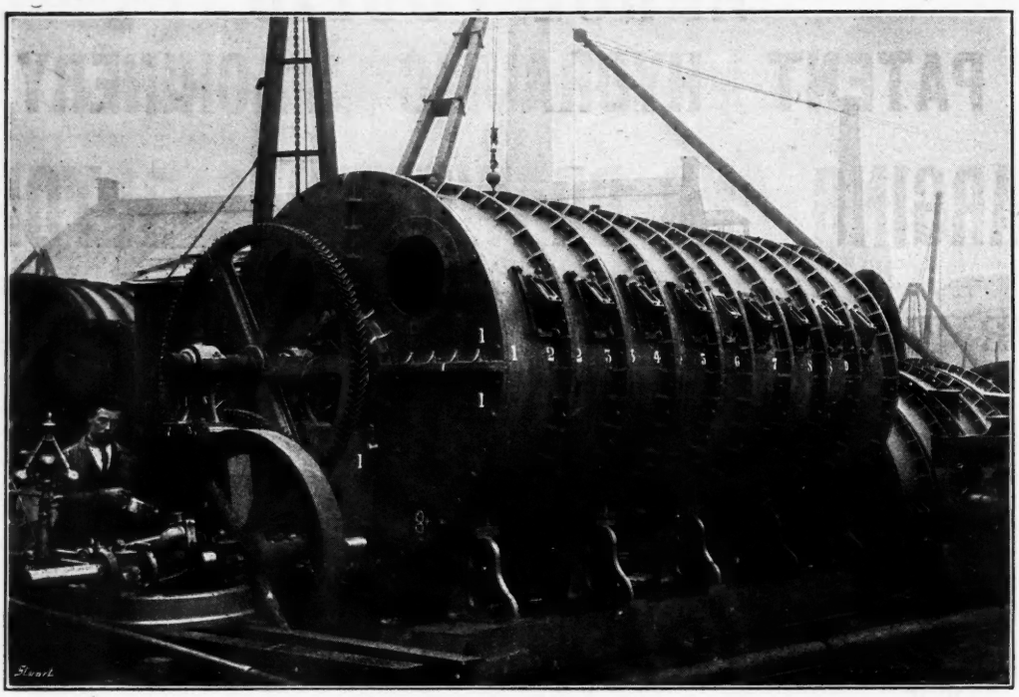
All Sizes from 50,000 to 5,000,000 Cubic Feet of Gas per Day.



The "NEW" Scrubber-Washer can be arranged to suit all cases of the Washing of Gases with Liquids.

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*COMPLETELY WINDPROOF.*

*BREAKAGE OF GLASS*
*REDUCED TO A MINIMUM.*

**Hinged top for convenience of Cleaning, &c., with door at bottom for lighting.**

**Perfect Diffusion.**

**Glass Cylinders Renewed at Small Cost.**

**WIDELY USED WITH BRILLIANT SUCCESS ON THE CONTINENT.**

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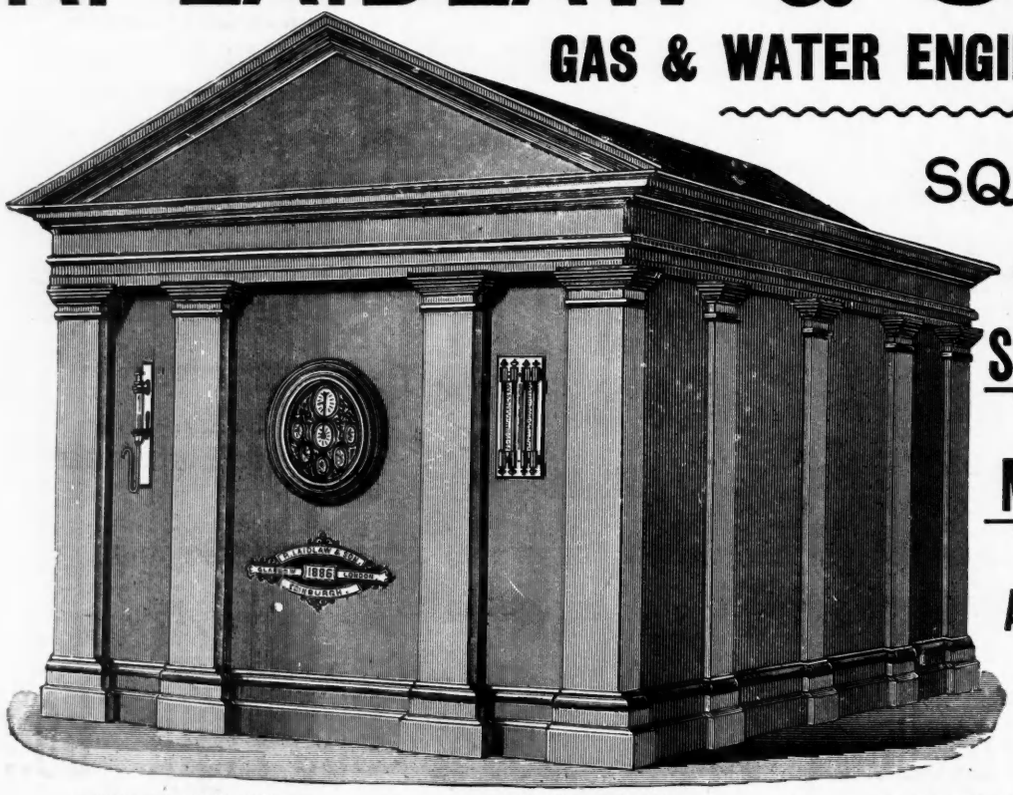

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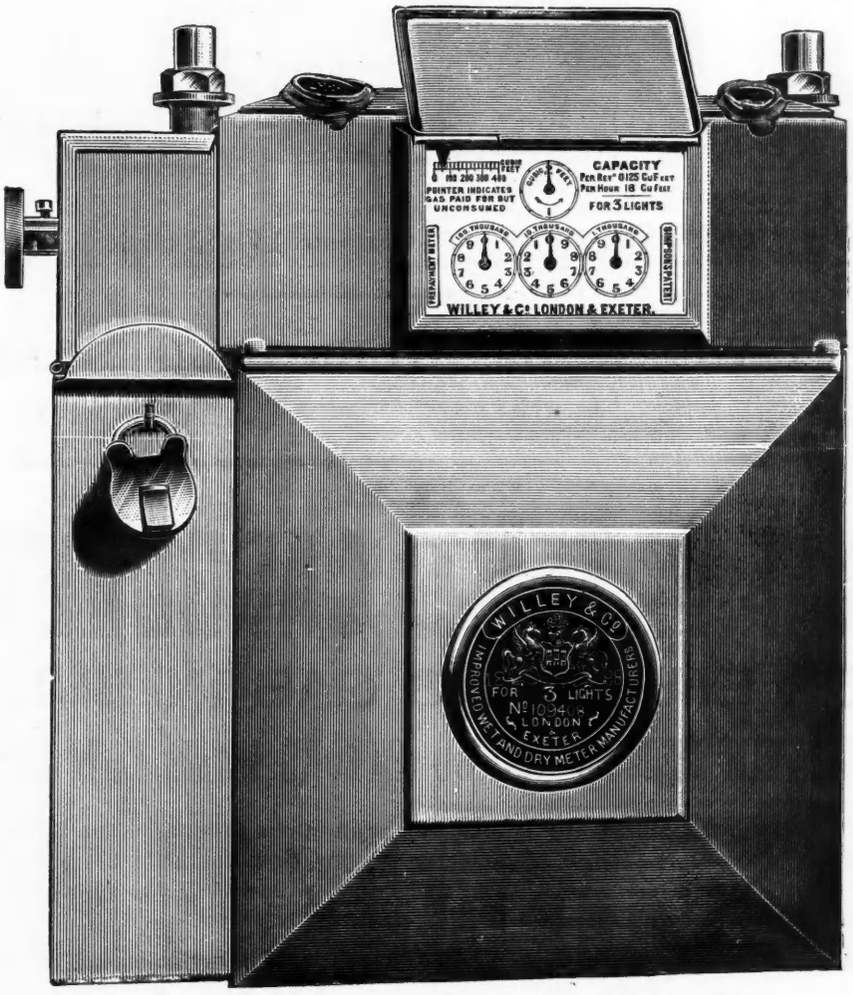


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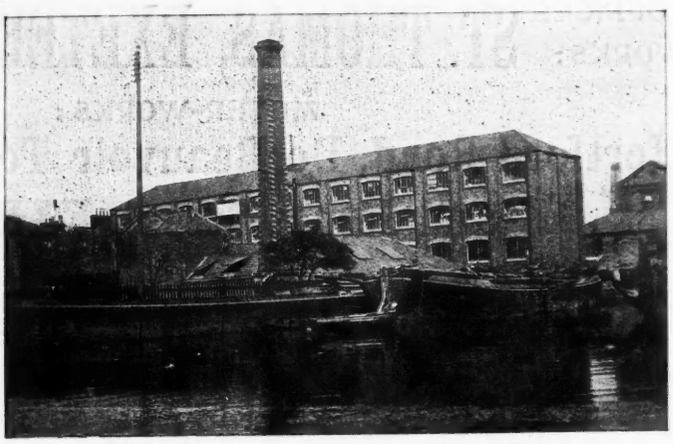

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**MANUAL CHARGING APPARATUS.**

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At the following Places:
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EXMOUTH.
One Machine at
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One Machine at
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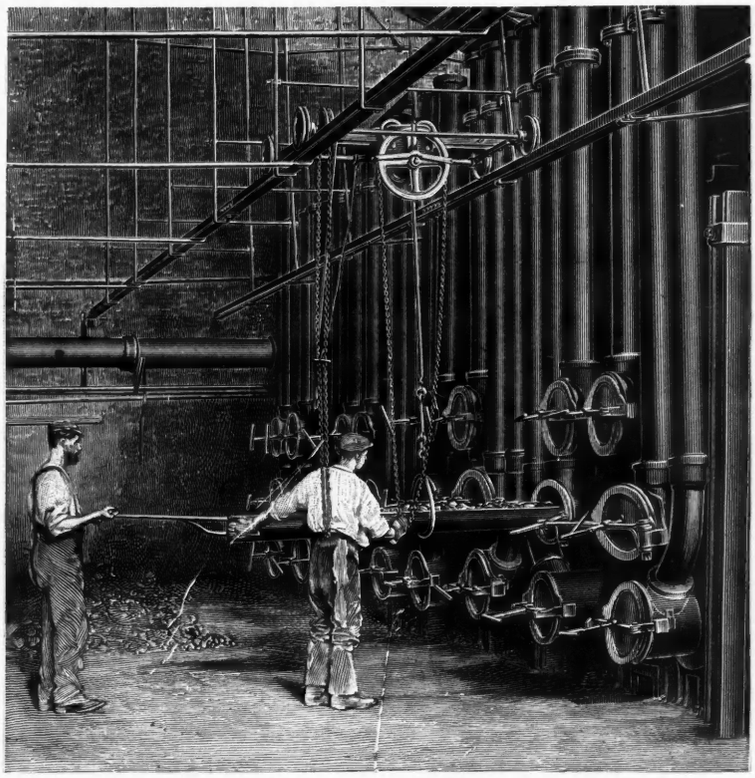

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THIS MACHINE CAN BE SEEN AT WORTHING AND TRURO GAS-WORKS.

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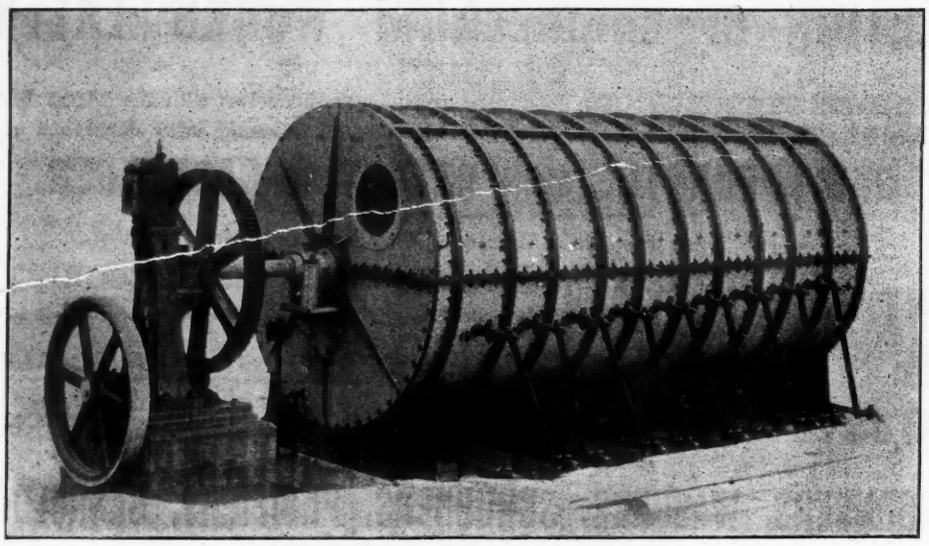
# PATENT "STANDARD" WASHER-SCRUBBERS

**which extract ALL the Ammonia and a large proportion of the $CO_2$ and $H_2S$.**

Prevention of Slip of Gas Unwashed
Strength of Liquor Concentrated.



Maximum Washing Surface.
Easy access to interior.

PHOTO. OF MACHINE (ONE OF TWO) RECENTLY ERECTED AT THE SALTLEY WORKS, BIRMINGHAM.

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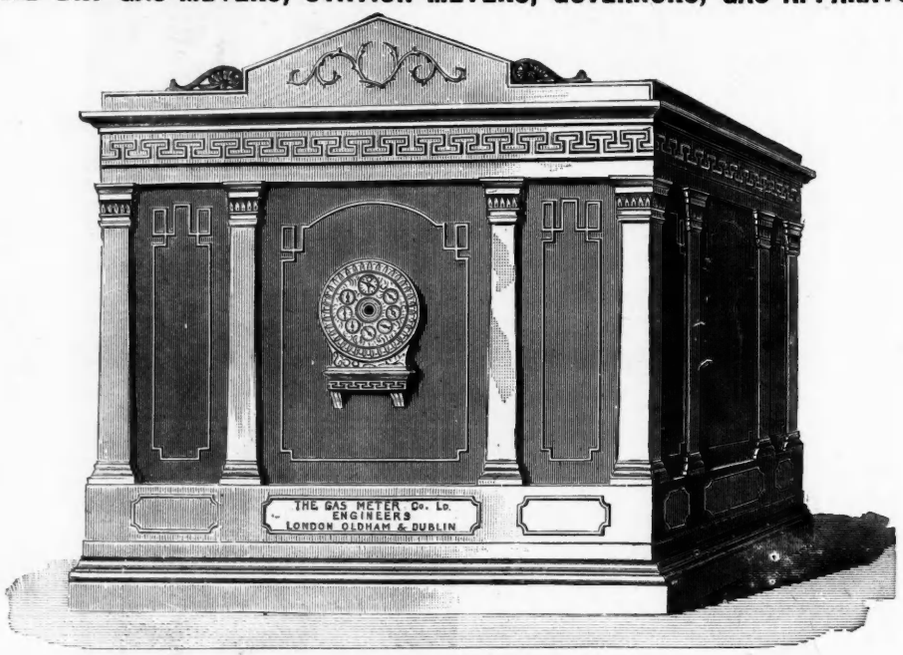


STATION METERS IN CYLINDRICAL CASES.

DESIGN No. 2 PATTERN.

STATION METERS MADE AT THE COMPANY'S WORKS, OLDHAM (Late WEST & GREGSON). Established 1830.

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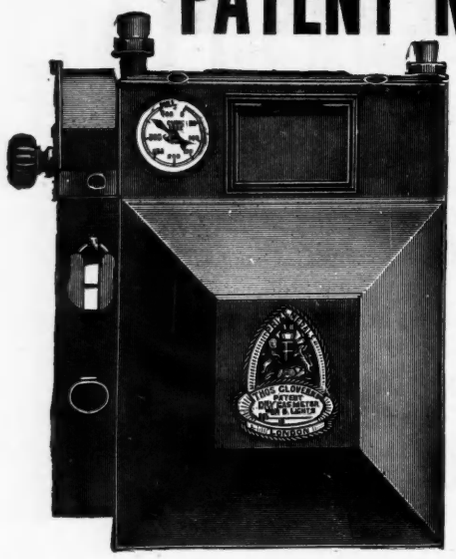

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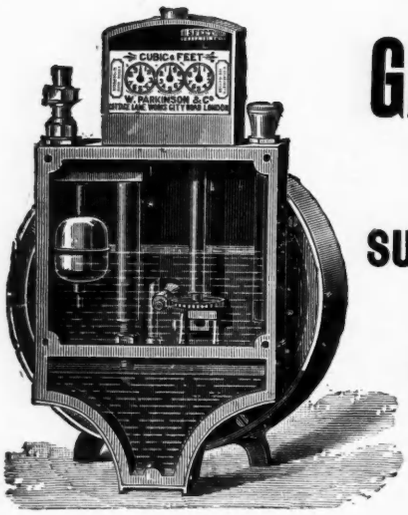


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## TO CORRESPONDENTS.

*No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.*

# EDITORIAL NOTES.

### The Affairs of the Gaslight and Coke Company.

THE meeting of the Gaslight and Coke Company on Friday passed off very quietly. The attendance was not large; and there was nothing in the speeches made from either side of the table to indicate that the Company are in any sort of trouble. The Governor, Colonel Makins, was more subdued than usual. Of course, he claimed that the accounts present a "fairly satisfactory" aspect, the chief point of everything being apparently that whatever may be the increased cost of carrying on the business, the consumer pays. Naturally, a coal bill showing an increase of 69 per cent. for the year falls upon both parties to the undertaking in unequal proportions; but most other extra expenses will not touch the proprietors. Has the reassessment put an additional burden upon the property? It must come out of the price of gas. The same with the cost of the wanton parliamentary proceedings of the London County Council. This is all true enough. But the circumstances of the time are not such as to warrant the laying of much stress upon this order of considerations. The most important statement made by the Governor was to the effect that the Directors intend to go to Parliament again next year with a full statement of the past and actual condition and future prospects of the Company, and possibly with a proposal to accept the recommendation of the Powers of Charge Committee in regard to a reduced initial price for any fresh capital. It is much to be regretted that the wisdom of the Board did not run to this a year ago. As it is, it is to be feared that their belated concessions in this and in other matters at issue between the directorate and the public authorities, will only encourage the latter to hit them again in the hope of getting still better terms.

One cannot help thinking that it would have made all the difference in the world to the Company this year, if, in addition to applying for cheap debenture capital, their Bill had asked for a moderate amount of new stock to be raised under the terms suggested by Sir James Rankin's Committee. It might be objected that if Parliament would not give the Company debenture stock, still less would it have been disposed to grant additional share capital to the undertaking. But this is not by any means obvious. At any rate, the subject would have been brought up, and the recommendations of Sir James Rankin's Committee could have been gone into. As it was, the mere repetition of the Bill of the previous year, although a reasonable and proper proceeding from the point of view of Colonel Makins, was a hopeless blunder in the circumstances. It is all very well for Colonel Makins now to protest, when it is too late, that nothing was farther from the Directors' thoughts than anything like flouting the Powers of Charge Committee; but it is impossible to compare his tone on Friday with that of his address last August without noting a vast difference. He still magnifies the circumstance of the Powers of Charge Committee having taken unsworn evidence; but that is a haunting thought of his which nobody outside the Company regards as of any consequence.

Perhaps among other matters concerning the Company of which a clean breast is to be made in Parliament falls the subject of the composition and working of the Court of Directors. While they are about it, the Directors of this great concern had better tell Parliament how much time and attention they give to the affairs of the Company. An impolite London newspaper last week suggested that these gentlemen must be so overworked that it would be an act of kindness on the part of the shareholders to relieve them of their appointments at Horseferry Road. Surely, it is thought, such a Company might look to have a Chairman all to itself—or at least a specialist in gas. Anyone who will take the trouble to consult the usual sources of information in these matters will be inclined to marvel at the vastness and variety of the cares which rest upon the shoulders of the estimable gentlemen now constituting the Chartered Board. Pluralist directors mean amateur or perfunctory administration. At any rate, the Gaslight and Coke Company cannot be cited as proof to the contrary. They also mean an oligarchic chief executive; and this is very finely exemplified at the Horseferry Road. Oligarchies are usually both tyrannous and inefficient; and if the capital account and the course of gas prices of the Gaslight and Coke Company since the last amalgamation do not favour the latter view of the administration, then all the expert criticism that has

been applied to the working of the Company during the last fifteen years is wide of the mark. Colonel Makins has complained of this criticism as being vague and general in character; but his defence is conspicuously of this description. He has never taken the report of the Powers of Charge Committee line by line, and given the facts a different turn. Perhaps this is another of the things which are to be done next session.

Otherwise, one is reluctantly driven to fear that the next Bill of the Company will fare as the others. The general body of the shareholders are plainly incapable of initiating or controlling any policy. In all the circumstances, the singular lack of interest in their own corporate affairs displayed by the proprietors last Friday is a very bad sign. It will encourage the opposition to the Board. Apart from all questions of policy, the interest of the meeting centred in the problem of coal. Several contradictory views of the future of coal were expressed in the room; and mention was freely made of the folly of householders in largely stocking coal at the present time, which is merely playing into the hands of the dealers.

### The Coal Question.

THE Government have not, as yet, yielded to the request for the appointment of a Royal Commission on our coal resources; and, judging by the reply made by Mr. Balfour last Thursday to a question on the subject put to him by Mr. D. A. Thomas, no such Commission is likely to be nominated this session. Mr. Thomas prefaced his question —as to whether the Government could now see their way to cause such an inquiry to be made as would remove the prevailing uncertainty in regard to the quantity of coal remaining unworked and available for naval, domestic, manufacturing, and commercial purposes—by the phrase, "having regard to the growing scarcity and dearness of "coal." Mr. Balfour, in his reply, hit the right nail very truly on the head when he said that he did not think the present scarcity and dearness of coal had "any relation to "the larger issue dealt with in the main part of the question." As we have time and again pointed out, the prevailing "scarcity" and high price of coal are no more due to an actual shortage of the mineral in the pits, than the present dearness of diamonds is due to the exhaustion of the Kimberley mines. In each case the enhancement of value is due to a temporary failure of the output to equal the demand.

It is, then, a confusion of unconnected questions to put the need of further inquiry into our coal resources on the ground of the present condition of the market. The latter has merely served to call public attention once more to a subject that is always of equal importance, but is not always given an equal measure of consideration. We know, as certainly as is humanly possible, that we have ample supplies of coal in this country to provide the requirements of the nation's home and foreign trade for many years to come, and that the prevailing dearness of coal is simply due to the fact that we cannot get at these supplies as quickly as we need them. The public, however, require to be reassured on the point—for they are being needlessly scared by the "headline" Press—and those who feel no anxiety as to the immediate future have thought, as we have thought, that the present is a good opportunity to obtain further knowledge as to the probabilities regarding the duration of the best and cheapest coal. For the question of the most practical importance is, of course, not when our coal supply will be exhausted, but when the cost of production, from physical causes, will be permanently increased, and the level of average coal prices permanently raised in consequence. This and the question of our coal resources considered as a munition of war constitute the real basis for an expert inquiry. The existing condition of the market is merely due to temporary and passing circumstances.

The question of most and pressing importance for the gas industry is, of course, how soon the present tense will be changed for the past, and it will be possible to speak of those temporary circumstances as matters of history rather than of living concern. Mr. Livesey, speaking at the Horseferry Road last Friday, was refreshingly optimistic; and, while Colonel Makins had in his preceding references painted the future somewhat darkly, he afterwards fell in with the more hopeful view that the tide had turned in favour of the buyer. As Mr. Livesey pointed out, the public—alarmed by the sensational forecasts of some of the newspapers (and oh, the dreary nonsense that some of them print daily!) as to the possibilities of the coming winter—have been playing straight into the hands of the coalowners and merchants, who neither, by their own account, are reaping any profit, by frantically scrambling for their winter stock of coal. A very few weeks will see that scramble ended, and it will then not be long before the inevitable reaction in the house coal market follows, for it is certain that the householder will not be extravagant with his coal this winter, and a mild season will upset the calculations of not a few coal gamblers [not, as the printer made us say last week, of the coal "grumblers"]. The most uncertain factor of the situation —one to which we think Mr. Livesey did not, perhaps, give adequate importance—is the export trade; and that is, admittedly, the most difficult to forecast. In our opinion, the continued heavy shipments to other countries will prove sufficient to keep the market stiff for some time to come; so that we do not expect to see it break much this side of Christmas, and it will then be a "weather market." But be it a month sooner or later, the break is coming.

Upon this question of the export trade, we would again repeat our regret at the mischievous shriekings of a section of the newspapers—some who might be excused on the ground of irresponsible youth did they not exercise such an influence on the even more ignorant public; others who ought to be above such work—as to the meaning of the expanded condition of the export coal trade. From every trustworthy source it is only possible to find refutation instead of confirmation of the sinister rumours as to the use to which foreign countries are putting, or mean to put, the coal they are buying from us. An American official report on the European coal difficulty (from which we give elsewhere some extracts) bears witness to the great need in France of coal for industrial purposes—leading her, indeed, to buy large quantities from America; while Mr. Charles Fenwick, M.P., points out, in a contemporary, that steam coal rapidly deteriorates when stored in the open, and that, in his opinion, this fact alone is sufficient to prove the falsity of the alarm-cry raised. A final exposure of the falsehood of the story that the coalfields of Wales are being drawn upon to an abnormal extent for the supply of foreign navies is, moreover, provided by the fact, communicated to the House of Commons by Mr. Ritchie on Friday last, that the exports of coal from Wales during the first six months of this year show a decrease of 400,000 tons compared with the corresponding period of 1899.

### A Call for Enterprising Gas Companies.

A SUGGESTIVE paper entitled "Means of Stimulating the "Demand for Electricity" was read by Mr. H. Collings Bishop, the Borough Electrical and Tramways Engineer of Wigan, at the last meeting of the Municipal Electrical Association. Mr. Collings enumerates and also comments sagaciously upon the ordinary aids to good electrical business, beginning with "low price"—which, as he observes, requires no commendation—and running through "free "wiring" and the rest. Of some of these expedients, particularly the last named, it is remarked that they are "not "as satisfactory as at first sight they appear." Of course, the electric lighting engineer is greatly handicapped by the costliness of the service, and also of everything the user of electricity needs—wiring, meters, motors, and the rest. Yet he does his best to get trade into his hands; and if even he is slightly optimistic on the point of the comparative cost of electric and gas light, he is less blameworthy than the gas manager who is only too often heedless of the whole subject. We desire now to engage the attention, not only of managers of gas-works, but even more especially of directors and corporation gas committees, to the imperative necessity for their showing more commercial enterprise in the cultivation of their business.

Gas managers, particularly this year, have as much work on hand as they can possibly get through to make ready for the coming winter's work. On all sides we hear woful tales of the impossibility of having new additions, and even ordinary repairs, done to time. Dearer gas is not making the slightest difference in the demand, simply because the people know that coal and oil are dearer likewise; and they stick to gas in the hope that the price will fall again some day. It is not to be expected, therefore, that the works manager, or the engineer of the whole undertaking, can himself take up the propaganda of incandescent lighting, and push gas-fires for the winter, in the style recently reported upon by Mr. Webber as now prevailing in Germany, and as repeatedly advocated in the "JOURNAL." The manager, in

short, has his hands full, and is probably otherwise unsuited for carrying on an active outdoor campaign on modern lines. Wide-awake directors, however, can easily determine to appoint a new assistant, under the manager, to organize a new department. Now is their opportunity, when advanced prices, although not checking the popularity of gas, will naturally dispose the consumers to look more favourably than ever upon the incandescent system. All business men know well, moreover, that when trade is brisk is the right time to push it. Amateurs and mere officials might think to wait until trade flags before making an effort to revive it; but that is because they are amateurs and officials. In this way, dearer gas might positively be made the excuse for driving a smart trade in economical burners. Besides, when the corner is turned, and it becomes possible to take a penny off the price, this money had better be spent in the enterprise of pushing gas into the houses and shops of the people on the most approved modern lines.

Not, of course, that it will always, or even often, be necessary for gas companies themselves to do the work of fixing and maintaining incandescent burners after the German fashion, which pays so well. It will often be possible to make arrangements for this accessory work to be undertaken at a tariff by respectable local tradesmen; and this should always be arranged if it can be done. The shopkeeper can always, if he has a spark of enterprise, keep a better class stock of gas-fittings than the gas company or corporation department. It is his business to do so. This is precisely how it is managed in Berlin, Magdeburg, and many other Continental towns. Unfortunately, however, good gas-fitters, and even ironmongers worthy of the name of craftsmen, are not to be found in every gas consuming district. In London, reliable work of the kind is confined to amazingly few hands; and in the suburbs, sound specialists in gas-fitting on modern principles can hardly be said to exist. The "cash stores" has destroyed the old working tradesman who kept a shop of his own; and if there is one "department" of the "stores" which is mismanaged, it is usually the plumbing and gas-fitting. Some builders keep decent "three-branch hands;" but to call one of them in is like going into a lottery. We should like every board of gas directors throughout the land to appoint a small committee out of their number to investigate this matter, and ascertain how a new and more aggressive style of developing their ordinary staple trade can best be fashioned and carried into effect.

By dint of a vast upheaval of intelligence and enterprise, some gas directors have actually risen to the giddy height of sending out circulars, to meet threatened competition by corporation electric lighting, showing how much cheaper gas is than the rival illuminant. This is not enough. If the competition were between two gas companies in the same town, they would soon sharpen one another up; and one would be giving away incandescent mantles and gas-fires to spite the other. Is there no middle line between cut-throat competition and utter slothfulness in business? Let us hope there is, and that the "shake-up" which has been administered to the British gas industry this year by a handful of men who live in their epoch, will not pass away without leaving any permanent effect. Gas companies must do more for their public than they ever did before. Eternal vigilance is the price of prosperity, as well as of liberty. If gas companies go to sleep, the electricians will steal a march upon them; and serve them right. Only, it will not be fair to put all this additional work upon gas managers. Give them technical secretaries or outdoor assistants, and the business will go. The existing staff will rarely be found suitable for the task. Lastly, it is unnecessary to wait for the further throwing open of the mantle trade in this country. There is no longer any serious ground of complaint with the home facilities in this regard. The better and more careful class of prepayment-meter consumers might be encouraged to take to incandescent lighting forthwith. If these things are done promptly, the demand for electricity will require more "stimulating" than ever.

#### The Labours of the Sulphate of Ammonia Committee.

At the third annual meeting of the Sulphate of Ammonia Committee last Tuesday, the Chairman (Mr. W. G. Blagden) was able to give a very good account of the useful work performed by the Committee during the twelve months to June 30. A great deal had been done in the matter of printing and distributing essays on the value of sulphate of ammonia as a manure, and there was an increase in the number of Agricultural Societies who had undertaken to carry out the Committee's prize competitions. Special arrangements had been made, too, for articles on the use of sulphate of ammonia to appear from time to time in various newspapers; and a large number of advertisements were inserted. In addition to all this, the Committee are setting aside a considerable sum in the accounts for the purpose of carrying out a new series of grain competitions, in which, alongside the plots to be manured with sulphate of ammonia, were to be other plots manured with nitrate of soda. Such a liberal programme as this, of course, requires much money to carry out; and it is disappointing to learn that during the past year there has been some falling off in the income of the Committee. Seeing that the sole object of the Committee is to encourage the greater use of sulphate of ammonia for purposes for which it is eminently fitted to be employed, it is surely the duty of all manufacturers of the article to assist in the good work by every means in their power. Although, as was pointed out by Alderman Miles at the meeting, the Committee was not formed for the purpose of artificially maintaining the price of sulphate, the result of persistently bringing its good qualities as a manure before farmers must be to much increase its value. From this all sulphate of ammonia manufacturers will derive benefit; and therefore it does not seem too much to ask that they should all assist, monetarily and otherwise, in the attainment of the object in view. Sulphate is at a considerably higher price now than was the case at the time when the Committee commenced operations; and it is fair to argue that this increase has been caused, to a large extent at least, by the work that has since been accomplished. Accompanying the Committee's report was that of their Agricultural Adviser (Mr. John Hunter), dealing with the experiments carried out in 1899. These experiments constitute a strong argument in favour of the use of sulphate of ammonia as a manure. Mr. Hunter, referring to the competitions in which sulphate of ammonia and nitrate of soda are being carefully tested against each other on oat crops, says: "It is too early to "form any opinion of the ultimate results; but if there be "anything like confirmation of those obtained at Dalmeny, "Woburn, and elsewhere, the bulk, and more especially the "weight and the quality of the grain, should in every case "be better where sulphate of ammonia is employed." We shall look forward with interest—and doubtless our readers will also—to the conclusion of these experiments. The question is not whether sulphate of ammonia will come in first, but as to how far ahead of its rival it will be. As we have already said, it is the Sulphate of Ammonia Committee who are doing the work; but it will be the general body of sulphate manufacturers who will reap the benefit.

#### A Question for Belfast.

The Belfast Corporation has hitherto ranked with the Corporation of Glasgow in the "first flight" of those municipalities which serve their public with gas and other necessaries at the lowest possible cost. If one may safely judge from the newspaper report of the last meeting of the Town Council, however, there is some danger of the financial purity of the various trading Committees of the Corporation being soiled by the adoption of the "spoils" system. It has been the practice of the Gas Committee to apply their profits to the purposes of their own undertaking, with an occasional exception in favour of a special grant in aid of some particular and pressing municipal cause. Quite recently, the Finance Committee of the Corporation cast envious glances at the profit balance of the Gas Committee, and suggested that they might have some of it for the general purposes of the Corporation. The Gas Committee resisted the suggestion, on the ground that as coals and oil are going up they could not bind themselves to do more than try to avoid an increase in the price of gas, certainly not countenance any talk about an outside subsidy just at present. This snub was not taken in a humble spirit by the Finance Committee, who retaliated by moving a resolution at the Council meeting that £10,000 out of the gas profits should be handed over to them for the credit of the general purposes rate. This brought up the question of policy; and accordingly the whole matter was talked up and down at the meeting in a very interesting way.

It is unnecessary to repeat our own views on the question

of the proper allocation of municipal gas profits, which are quite familiar to readers of the "JOURNAL." It is curious to mark the clearness and completeness with which the issue was presented before the Belfast Corporation. The Town Council were informed that if they directed the Gas Committee to pay over £10,000 or any other sum out of their so-called profits in aid of the rates, the Committee would simply at their next meeting put up the price of gas to a corresponding figure. There are no profits on the gas undertaking, properly speaking, and nobody knows whether the price of gas in Belfast may not have to be raised in order to make both ends meet. Consequently, the question which had to be decided was whether the gas consumers should be directly taxed another £10,000 in aid of the ratepayers, or whether the ratepayers should be left to pay their own scot and lot as before. It is satisfactory to learn that the latter course was decided upon. It is one thing to set aside a lump sum in aid of rates out of gas profits already made, and quite another thing to deliberately put up the price of gas in order to make the profits. That is how it looks to the ordinary town councillor. Essentially, of course, there is no sort of difference; but, human nature being what it is, a difference appears between the two proceedings, which in this case proved too much for the Belfast Corporation.

This body should take warning by Manchester, where the Corporation have actually done, in defiance of the Chairman of the Gas Committee, what Belfast would not do. The truth is that in this, as in other downward courses, it is only the first step that costs any pain and doubt. Once let the subsidizing of rates out of a trading committee of a corporation become a regular practice, and it will be persisted in, even at the risk of doing such an injustice as that which the Belfast Corporation are not yet prepared to inflict upon the poor gas consumer. They have long become hardened to this at Blackpool, even, where they make the prepayment meter consumer pay more for his gas rather than let his landlord suffer a little extra rating. The Lord Mayor of Belfast, during the recent debate, made a weighty observation upon the rate at which the gas consumers of the city have been taxed to extinguish the capital of the undertaking. He is quite right in holding that this process can be overdone. There is no good reason why the next generation should be presented with gas-works free of capital; but, on the other hand, there is no just cause for reducing the general rates at the expense of the consumers. The best interests of a city, more especially a manufacturing city like Belfast, are served by cheapening the gas supply to the utmost; for cheap light and power are the first inducements to industrial expansion within the limits. Subsidies are usually taken out of the wrong pockets and paid to the wrong recipients. Besides which, they generally cover up something which had better stand out in the light. For these and other reasons, it is to be hoped that Belfast will keep its municipal finances pure, and will not fall into the way of the indirect taxation of the gas consumers after the Manchester pattern.

#### More Newspaper Ineptitudes.

THE sage who bade his son observe with how little wisdom the world is governed, is never likely to pass beyond the range of sympathetic quotation. His immortal remark might be expanded nowadays to embrace the wonderful lack of knowledge of common things which writers in our newspapers occasionally betray. How is it, one is inclined to inquire, that individuals capable of writing such vapid stuff contrive to obtain the opportunity for directing "public opinion"? We are well accustomed by this time to the perfervid gentleman—or is it a lady?—who pours editorial scorn on the suggestion that an advance of 8s. per ton on the price of coals, to say nothing of other advances, should suffice to explain why it is that gas companies in general have raised the price of gas. He was beaten lately by another journalist who told the readers of a leading London newspaper that the wicked Master Bakers' Association had forced up the price of bread, and concluded his tirade with the remark, "and flour is dearer, "too." Next day the newspaper very properly published a letter from a representative of the baking trade, asking courteously whether the journalist was aware that bread is made of flour; and, if so, whether there might not be supposed to be a natural connection between the selling prices of the two commodities? This is the sort of thing that makes common-sense people pitch their newspapers into the waste-paper basket. It is only too true that the civilized world is struggling through an era of high prices. How long this will last, or what will be the end of it, nobody can say. The economists seem unable to make up their minds about a "theory of value;" but the practice of marketing is painful enough at present for those who are constrained to make a fixed income meet at both ends, whatever the cost of necessaries and luxuries. They must do without some things; and among the superfluities likely to be dispensed with first are, one would fain believe, the mushroom crop of trashy newspapers and periodicals which have appeared so thickly during the past year or two, and rarely contain anything either more entertaining or informing than the chatter of one street loafer with another. Time was when the conductors of periodicals were supposed to be able to inform or amuse their patrons in a rather superior manner. They were experts, in short, in their various lines. But nowadays, apart from circulating news, the journalist seems to be chosen because he knows no more of any subject than the man who is expected to read him. So when some retired tradesman on the London County Council calls dearer gas a "monstrous imposition," the journalistic sycophant of this distinguished body adds that it is shameful to charge the ratepayers more for their gas, at the very time, too, when the County Council's own coal bill will be £40,000 heavier than that of last year. Thus democracy repeats the folly of ancient rulers.

## WATER AND SANITARY AFFAIRS.

WHEN commenting last week upon the short supply of water in Paris, we alluded to the prevalent rumour that it had been brought about by the use of the filtered water for street sprinkling and industrial purposes; and the fact that the Municipal Engineers were making efforts to bring the contents of the reservoirs up to their normal condition seemed to indicate that they had been rather too heavily drawn upon. But that there should have been any necessity for curtailment is somewhat surprising, in view of the fact that quite recently the aqueduct to convey to Paris the water from the new sources of supply—the Loing and the Lunain—has been completed. It was understood that by its aid an additional 11 million gallons of limpid water of fine colour, containing little organic matter and few bacteria, would be available for the use of the citizens. But it looks as though this new supply is not yet ready; and as rather alarming statements are being made as to the quality of the water now being distributed, it is possible that that derived from some of the other sources has been sent out imperfectly filtered. What these waters are like in their raw condition is shown in the Municipal Pavilion at the Paris Exhibition; and it was well for the authorities to clearly indicate that the consumption of Seine water for private purposes is prohibited, and also to show the effect of filtration. Such a display is reassuring, because warnings are being issued to intending visitors to Paris not to drink the water unless it has been filtered and boiled. It appears that the mortality from typhoid fever in Paris last year was very much higher than it had been since 1892—about 4300 cases being notified; while in the first ten weeks of the present year some 800 cases came under the notice of the authorities. It would, perhaps, be going too far to attribute this condition of things to contaminated water, seeing that a very large number of the houses, bright-fronted as they are, are still without proper sanitary appliances; while the upper rooms, usually occupied by servants, are described as "kennels hardly fit for a dog." We have been hearing lately something about the effect of the contiguity of a sewage farm upon the water supply; and possibly the great establishment at Achères, upon the land of which, close upon 2500 acres in extent, something like 13,000 million gallons of sewage was spread last year, may be responsible to some extent for the typhoid. At all events, there is the fact.

Reference to the sanitary condition of the Paris houses leads to a consideration of the housing problem, especially in connection with the working classes. A conference convened by the Sanitary Institute discussed this matter for two days at the beginning of last week, and visits were paid to the artisans' dwellings erected by the London County

Council on the Millbank Estate, Westminster, and on the Boundary Street area, Bethnal Green, as well as to those put up by the Richmond Town Council. The proceedings on the first day were presided over by Mr. R. Melville Beachcroft, of the London County Council, who opened a discussion on the subject of "Unhealthy Areas and the "Displacement of Town Populations." Comparing the work of clearance effected by the Council with that done by their predecessors, the Metropolitan Board of Works, he showed that the cost per head was £50 with the former and £59 with the latter—the difference being attributable to the special compensation provisions of the Housing Act of 1890. He pointed out that, in carrying out these schemes, every large clearance effected by the Council must involve the buying out not only of the "slum" owners, but also of trade interests; and it was this which caused the loss to the ratepayer. It would seem, however, that the loss must be borne, on sanitary grounds. The disappointing feature in these schemes is, as Mr. Beachcroft acknowledged, that so few—a mere fraction—of the displaced residents in the slums find their way back into the new dwellings erected for them; and consequently Lord Rosebery's question as to what is to be done with the displaced residuum has still to be answered. Mr. Beachcroft thinks that the *crux* of the question lies in providing accommodation on the spot for the residents displaced, before the actual displacement; and, in his opinion, no clearance scheme should be allowed to pass in which no provision is made for this. It is all very well to turn out the poor people, but where are they to go to? In the new buildings hitherto provided for them the rents are too high and the restrictions too great; and they consequently get into the suburbs.

## ESSAYS, COMMENTARIES, AND REVIEWS.

### GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 367.)

After so quiet a week as that which preceded it, no wonder can be felt that last week showed no acceleration in point of activity. With one day short (Saturday was a closed day), and with the holidays impending, the natural tendency in the markets was to slow down till they barely moved. But quiet as things were, they were not so much depressed as they might have been; and in some departments the tendency was pretty firm. In the Money Market, there was a fair demand for the end of the month, which prevented a lapse towards easiness, and discount rates were disposed to be firm. In the Gas Market, there was almost an approach to total stagnation. Hardly any dealings were marked, and changes in quotation are almost *nil*. It would really seem that holders of stock are learning wisdom, and are declining to sell at present prices. We made some remarks last week as to the indications that gas companies had been doing good business during the half year just completed. What has transpired since then fully confirms this view. The published accounts show that the demand for gas is constantly increasing—indeed, some companies find that it is in greater demand than ever. This is the true test. Gas companies may have to pay sometimes more and sometimes less for the commodities they buy; but the ever increasing demand for the commodity they themselves purvey is the sure indication of prosperity. Therefore let shareholders take heart, sit tight on their stock, and await with confidence the inevitable swing of the coal market pendulum back again.

As to market movements in gas on the Stock Exchange, they were: A few transactions of hardly any importance took place at figures practically unchanged from those which were marked at the close of the preceding week. The changes in quotation were of the slightest. Gaslight debenture stock was lowered a point on Tuesday, and the preference stock was put down half a point. On the following day, Imperial Continental debenture stock was also lowered half a point. The Water Companies, for once in a way, offered more features of interest than the Gas Companies, and were the subject of some irregular ups and downs. East London fell 2; but ditto debenture rose 3. Grand Junction rose 2; but Southwark ordinary fell 6.

### ELECTRIC LIGHTING MEMORANDA.

**Professor W. E. Ayrton on the Electric Power Bills—The Shame of Bumbledom—Wanted, Cheap Energy—A Fair Field and No Favour.**

The Electrical Power Bills form the subject of an interesting article by Professor W. E. Ayrton in a recent number of "Nature." The writer is in the proud position of being able to turn up the report of an old lecture of his own, delivered in Sheffield so long ago as 1879, in which the question was asked to which these statutory schemes have at last responded. The question was: "Why should not division of labour be carried to its end, and power be brought to you instead of you to the power? Let us hope then that in the next century electricity may undo whatever harm steam may have done during the present, and that the future workman of Sheffield, instead of breathing the necessarily impure air of crowded factories, may find himself again on the hill-side, but with electric energy laid on at his command." That is the point of the whole of this modern electric power distribution business—the bringing of the power and the tool to the work, instead of requiring the workman to attend upon the concentrated power. It is worth while to let one's imagination dwell for awhile upon this aspect of the subject. Here the idea is to be found, if at all; and all experience teaches that the idea, with the point of view which it gives to the man who is able to take it in, is by far the most important thing about a new social or industrial development. It is to the abiding shame also of the blatant representatives of modern Bumbledom—now called Municipalism—that they have been blind, deaf, and selfishly obstructive to all that Professor Ayrton has to advance in respect of the new idea in electric power supply.

Hitherto, in England, as we showed some time ago, the scheme of electric power generation and supply for all purposes, of which lighting was the chief, has rested on a parochial basis. The Electric Lighting Acts embodied this idea; and consequently the minds of that large and influential order of the British public which habitually adjusts itself to statutory standards in affairs, insensibly accepted this limited basis as all-sufficient and final for the electrical industry. Town clerks are the brains of this order in the community. Over and over again it has been made manifest that the idea of electricity supply as a parochial—that is to say, a municipal—perquisite has overpowered the perceptive faculty of otherwise broad-minded gentlemen of this class. It was a great shock to them when first the Joint Committee, and next the House of Commons, refused to put electricity supply in bondage to local authorities. They could not get rid of their point of view in this regard; and when we last wrote on the subject, we had to register the probability that the Association of Municipal Corporations would make use of all the forms of parliamentary obstruction in order to destroy the fruit of the labours of Sir James Kitson's Committee. Wiser counsels have, however, prevailed. Though probably as convinced as ever of the divine right of local authorities to play dog-in-the-manger to any form of enterprise which does not happen to pay tribute to themselves, the Associated Municipalizers have ceased lobbying for the present.

This spell of breathing-time may well be utilized in taking stock of the situation from Professor Ayrton's standpoint. Let us smother the craving for municipal profits for awhile, and listen to the idealist who may prove in the long run to be more practical than the official who cannot see an inch beyond his nose. Professor Ayrton asks his readers to consider with him the fundamental problems of civilized industry. What is it that does the mechanical work of the world? He answers—energy. Hitherto, when people needed this kind of energy, it has been customary for them to generate it, as and where they wanted it, from coal carried to the spot. "So accustomed are we to all this—so little does it strike us as incongruous that scuttles full of black lumps should be regularly brought into a dining room, no matter how valuable the pictures or rich the curtains and carpets—that we forget that our successors will look with more scorn on our customs than we do on those of our ancestors, seeing that, at least, their floor-coverings of rushes, intermingled with old bones and other refuse, could not be much injured by smoke or by dust." Electricity is capable of serving the same purpose as the coal-scuttle, with a difference. But the question of "means" is inseparable from that of "ways." How does the matter stand financially? Is it cheaper to concentrate electricity production on a favourable spot for the purpose, and distribute energy in this form over a wide area, or to carry the coal about as before?

Professor Ayrton understands that it is idle to talk of electric energy as some electrical witlings do, as carrying its own recommendation in its "scientific" character. That is the language of Laputa, wherever it is heard. That commercial service is the most scientific which is the cheapest. There may be, and generally are, other things to be considered; but it is essentially unscientific to spend 6d. for a necessary of life when the same can be had for less money. The question of "bulked" electric power is therefore one of comparative expense, and is admittedly a highly conditional or circumstantial problem. Much of Professor Ayrton's article is devoted to the investigation and valuation of these conditions; and we regret that the limited space at our disposal for the purpose of discussing electrical topics does not permit of the reproduction in full of his able analysis of the case for and against the various Bills. It should be read in "Nature" for the 26th ult. His conclusion on the whole matter is that the decision of Sir James Kitson's Committee was good and acceptable in the circumstances. It tends to encourage the realization of the dream of those who would fain see power brought to the workman, as the cure for the incidental evils of the factory system, which originated in the necessity for taking the workman to the power. At least, it gives electricity a chance of showing what it can do in this way. Professor Ayrton speaks of the obstacles put in the way of this new agency by "England's spirit of masterly inactivity, and by its not unnatural, nor wholly unwise, veneration of vested interests." Well, this is now altered. Those municipalities which do their duty by the public will not be raided, and those who are really nothing more than preserves of Bumbledom will not be respected. We shall see what happens,

## FURTHER QUESTIONS FOR THE DEPARTMENTAL COMMITTEE ON PATENTS.

In connection with the appointment of the Committee to inquire into certain aspects of the Patent system of this country, the Manchester Chamber of Commerce has addressed to the Board of Trade an important letter criticizing the terms of the reference—which have already been discussed in these columns—and setting forth the views of the Chamber on other points of English patent law and practice which it is thought should be included in the inquiry. This is the only expression of opinion we have heard of from a Chamber of Commerce respecting the questions put before the Committee; and we are very glad to consider it in the light of an independent contribution to the controversial literature of a matter fraught with such important possibilities for the national enterprise and industry. Generally speaking, the subject of patents for inventions is only discussed in the technical journals, and some of these are in the habit of procuring their patent intelligence from professional agents—able gentlemen, and well-informed, but not necessarily competent to speak from the independent standpoint of the inventor, the engineer, or the manufacturer. It is the opinion of the Manchester Chamber of Commerce, to begin with, that the composition of the Departmental Committee leaves something to be desired. It is pointed out that, apart from the official element, the Committee is mainly composed of gentlemen eminent in the legal profession or engaged as patent agents; while only two are connected with industry, and these are not known for inventors or for experience of patent law in relation to industry. The point is well taken; but the composition of the Committee will scarcely be altered now.

There are, of course, many men of business who go through life without having anything to do with patents; as there are others whose whole work is among patented inventions. Many of the latter order of business men are still more fully qualified to speak of the relations between patents and industry by having fought heavy patent actions. These experienced persons should make capital witnesses before the Committee; but it does not follow that they ought themselves to sit on the Committee. The judicial spirit might be lacking, or obscured by a ravenous memory of certain "costs in the action." For example, the hand of Mr. Levenstein is plainly to be traced in this protest from Manchester; and Mr. Levenstein has a painful memory of some proceedings under Section 22 of the Act. While applauding the inclusion of this section in the reference, the Chamber reminds the President of the Board of Trade of the vexatious and costly transactions connected with the first action taken under the section. It is remarked that the "test case" submitted on this occasion proved the provision for compulsory licensing to be of little practical use "because of the onerous conditions imposed on the petitioner." We venture to think that this is not an impartial judgment. There are test cases and test cases. The specimen referred to in this passage was artificially prepared, with more than one object; and it is not wonderful that the consequences were not wholly satisfactory.

The Manchester Chamber of Commerce occupies firmer ground when calling attention to certain distinct abuses of the privilege of patent which are not specifically referred to the Committee. One of these is "the taking out of patents for speculative ideas or inventions, not defined, but serving the purpose of appropriating unexplored fields of discovery, and of blocking the way of subsequent inventors who may have worked out original and useful discoveries within the unexplored domain appropriated by the blocking patent." One has heard a good deal about this sort of abuse of the privilege of patents, usually in connection with complaints of the consequential process of disclaiming. It is sometimes argued that the liberty of disclaiming cannot be harmful to anybody, because there is provision in the Act against disclaiming with the object of enlarging the scope of the patent. But this safeguard scarcely meets the case. What is complained of is that, by simply disclaiming certain parts, in the light of later knowledge, a person interested in a patent is enabled to set up a monopoly over something which was only constructively covered by the patentee. Not to speak of matters too nearly connected with the gas industry, it is said there was a good deal of this kind of thing done in regard to the pneumatic tyre patents. There may not be many of these blocking patents in existence; but where they do exist, they are a great nuisance.

Secondly, there is the point of patentees with a foreign domicile, who can patent inventions in England which are not patented abroad, and accordingly make Her Majesty's lieges pay through the nose at home for things cheap enough elsewhere. Processes and products are alike subject to this imposition, which is obviously a restraint upon British trade. It is difficult to see how this particular grievance is to be remedied, consistently with the maintenance of a national patent system at all. Something might be done, perhaps, in the way of modifying the system of patenting "communications from abroad;" but the question is a very difficult and delicate one, raising as it does all sorts of problems of reciprocal action on the part of foreigners. A patent system is a luxury which has to be paid for. When the patent is not commercially successful, as in nineteen cases out of twenty, the patentee pays the expenses; when the patent is a success, the public pay. Much might be said for the abolition of patent right in one country or everywhere; but this is not a question of practical politics at the present time.

"A further question which the Chamber would gladly have seen in the terms of reference is that of providing for 'patents of addition,' by which the life of a supplementary patent should be limited to that of the original grant. In the absence of such provision, it is possible for a patentee to secure a new lease of life for an old patent in this country, whilst both the original patent and the addition taken out abroad expire together, leaving the invention open there, whilst here it remains a continuing monopoly." Here we have in general language the aspect of an important order of patents.

No example is given to show the enormous practical importance of the question raised by the Manchester Chamber of Commerce. It does not appear, all the same, that this particular Committee will be able to deal with it. The communication to the President of the Board of Trade will have the effect of drawing attention to the point; and this is as much as can be usefully done for the time being by those who have views respecting patent law reform. Another matter mentioned by the Chamber, but not referred to the Committee, is the liability to improper use of the provision of Section 18 of the Act, permitting the amendment of a specification "in the case of one not defined by drawings." This qualification is obscure. It probably has reference chiefly to chemical specifications, in which an apparently innocent form of words might cover a fresh invention. Lastly, the Chamber is of opinion that the contemplated inquiry might with great advantage be extended to embrace all such important differences between British patent law and that of foreign countries as are distinctly hurtful to British industries and trade. So it might, doubtless, if there were no particular hurry for the report, and the life of every member of the Committee were warrantable for another ten years. The direction, in short, is too vague; and the implied criticism founded upon the suggestion accordingly falls to the ground. On the whole, the Manchester Chamber of Commerce has done well to send this frankly-expressed and pointed communication to the President of the Board of Trade. By so doing, it has justified itself as a working body. It is very desirable that criticism and suggestion in regard to departmental action in such matters should not be left entirely to the technical journals; but public or semi-public bodies are slow and difficult to move, and somebody must do the chorus part.

## THE EUROPEAN COAL MARKET AND AMERICAN IMPORTS.

In a summary of the commerce and finance of the United States, recently published by the Washington Government, there appeared an article on "The Present Coal Crisis in Europe," which, as a careful study of the peculiar conditions prevailing in the coal markets of the Continent during the past twelve months, affords interesting reading to those concerned in the present and future of the coal trade of this country. From an abstract of the article published in the "Iron and Coal Trades Review" for the 20th ult., we have selected such points as bear most closely upon the state and prospects of our own coal market.

The year 1899, it is remarked, in spite of a large increase in coal production all the world over, witnessed an enormous increase in coal prices, causing serious inconvenience and difficulties to the entire industrial community, and particularly to the iron and allied trades, which depend upon coal, not only as a source of their motive power, but also as part of their raw material. This rise of price began in 1898, and was at that time ascribed to the diminished output of the British mines caused by the strike of the Welsh miners. But when, after the Welsh mines had resumed their output, the rise in price continued, it was seen that other factors were at work beside the temporary reduction—or rather, it should be said, the maintenance at the previous year's tonnage—of the British output. Chief among these factors, some at least of which still subsist, was the extraordinary activity of European trade (the iron and machine building industries especially); old works being extended, and new enterprises undertaken. The scarcity of coal was further aggravated by an extremely rigorous winter, coupled with serious lack of transport facilities in Russia; while the same difficulty in regard to transport was experienced to a lesser degree in France and Germany, and, we may add, in this country also. Then came the Boer war, with its consequent greater activity in the shipping trade, and enhanced demand for fuel for the arsenals, gun factories, and other establishments engaged in the manufacture of war materials, steel rails, bridges, &c. Other factors contributing to the dearth of coal were labour troubles in the St. Etienne district of France, and the protracted strikes in Moravia, Silesia, and Bohemia.

This dearth of coal, it is pointed out, is all the more remarkable in view of the fact that the world's supply has never been increasing at so rapid a rate as during the decade now closing. Since the year 1890, the production of coal has increased almost 30 per cent. In Great Britain, practically the only coal exporting country in Europe, the annual output has risen about 17 per cent. in the past ten years; about half of the increase being witnessed in 1899. In spite, however, of the heavier production, prices last year rose enormously—inferior coal being retailed in the poorer districts of London at as much as 2s. 4d. per cwt.; while in

Germany, 1899 prices showed increases of from 15 to 30 per cent. over those of the previous year. In Belgium, the difference between 1898 and 1899 prices amounts to about 50 per cent.; and the same remark holds true in the case of France. In Russia, the increase in price has been even more marked than in other countries, owing to the provisions of the restrictive tariff, which enhance the cost of both domestic and imported coal.

This universal shortage of coal has led to alterations in economic policy in some countries, and agitations in favour of such alterations elsewhere. The Russian Government decided to permit, temporarily, the free importation of coal, both for the use of railways and of some of the principal manufacturing centres. In France, where the scarcity has been most marked in the Lyons district, the high railway tariff—established chiefly to enable the coal of the district to compete with English coal coming by way of the Mediterranean—had to be lowered in order to induce the importation of supplies from Great Britain. The effects of this measure, however, were (says the report from which we are quoting) quite unsatisfactory, since the British mines were unable to meet the new demand on the part of the French manufacturers. The straits to which our neighbours have been put is indicated by the fact that the Paris and Lyons Railway have placed an order for about 75,000 tons with an American Coal Company, notwithstanding the high rates of freight between Newport News and Marseilles, the place of delivery.

Reference is next made to the fact that in this country the condition of the coal market has led to a serious agitation urging that the exportation of coal be prohibited, or at least taxed; the agitators pointing out that the exports of Great Britain have increased much more rapidly than the production. It is, the report continues, more than doubtful whether the agitation will have any practical results, as coal forms the chief heavy article of cargo that can serve as ballast for vessels freighted with lighter merchandise. Furthermore, coal forms one of the main articles of export to those European and South American countries from which England imports her foodstuffs and iron ore; and a prohibition of exports of coal, total or partial, would naturally result in increased cost of importing those foodstuffs and iron ore, due to the fact that higher freight rates would have to be charged by vessels which are now carrying coal from England to the respective countries.

In Germany, general dissatisfaction exists among the manufacturing classes on account of the high prices of coal, and the partial inability to procure coal at any cost. The Government have been urged to buy out the private coalowners—the Prussian Government already owns and works some of the Westphalian and Rhenish collieries—while many Chambers of Commerce have petitioned for the revision of the railway tariffs, especially those which encourage the exportation of coal. For, as the petitioners have pointed out, German coal is actually selling at lower prices in Austria and Italy than in Germany itself, notwithstanding the greater distance of the former from the mines. This state of things is due to the lower prices charged by the Coal Syndicate and to the differentiated railway rates, designed to encourage the export trade. This policy, defensible when the mining industry needed encouragement, is, it is urged, disastrous to German industries under the existing circumstances.

The agitation has grown, and has resulted in the question being brought before the Reichstag, where the methods of the Coal Syndicate were severely attacked. The Government declined, however, to grant the request for an immediate revision of the railway tariffs, on the ground that such a revision, if brought at once into force, would bear hardly upon the shippers, who were bound under existing contracts to deliver coal at fixed prices. The Syndicate, for their part, declared that the deficiency of coal was caused mainly by the larger requirements of the iron and steel mills, which have, in fact, bought up for their own use mines of an annual output of over a million-and-a-half tons; and, further, that the increase in exports was largely due to the strike of miners in Austria—the dealers being able to get much better prices in that country than in their own.

In Russia, as has been said, the Government were obliged to temporarily forego the import duty on coal. The import tariff had been avowedly imposed in order to protect the producers of coal in the Donetz Basin; the result being a shrinkage of output, and, consequently, a great rise in price, with serious detriment to Russian manufacturing interests. Moreover, it was argued that, Russia being an agricultural country, exporting wheat and other breadstuffs, she was losing heavily on those exports, because, since foreign vessels had to arrive in ballast instead of with coal, freights from Russian to other ports had risen very considerably, in some cases 100 per cent. A comparison of rates from Odessa to England with those from the Argentine ports to that country shows a difference of over a halfpenny per poud (36·1 lbs.) in favour of the latter; the reason being that English imports and exports from and to Argentina are more evenly balanced than those from and to Russia. As a matter of fact, the report states, the number of vessels entering Odessa in ballast during 1897 was 54 per cent. of the total ships entered; whereas, in the case of Argentina, 70 per cent. arrived with cargo. It remains to be seen whether the suspension or relaxation of the import duties on coal will be temporary or permanent; but it is most likely to be only the former.

Under the circumstances of the European coal markets as described, the American official report remarks, it is not surprising that the question of exports of American coal to Europe is being seriously discussed. Given the enormous distance of not less than 3000 miles between the ports of shipment and discharge, it is manifest that the cost of carriage becomes the main element in the price of coal shipped from the United States to European shores. The real question at issue is not merely that of comparative cost of production, but the combined cost of producing and shipping the coal to the foreign port. In this respect, Great Britain possesses a great advantage over the United States in that, whereas the weight and bulk of articles exported from the latter country are much larger than the weight and bulk of the imports thereto, exactly the opposite is true in the case of Great Britain. As it is, numerous vessels arrive in ballast at American ports; the addition of coal to the exports of the States would obviously but increase the number. Considerable exports of coal are, however, more likely to be made from the Southern ports, as such exports might form additional or complementary cargo for vessels engaged in the cotton trade. It is, moreover, probable that the South American market will be increasingly supplied by coal from the States, as in the trade between the northern and southern continents, the balance of trade, so far as weight and volume are concerned, is in favour of South America; and coal might therefore be used to supplement the cargoes of vessels bound for ports in the Southern Republics.

## PERSONAL.

Mr. F. W. Selby, of Witney, has been appointed Manager of the Lavenham (Suffolk) Gas-Works.

On the occasion of his wedding, Mr. George H. Cryer, who has been for the last ten years engaged in the Engineer's Department of the Rochdale Corporation Gas-Works, was presented yesterday week with a handsome marble timepiece. Mr. T. Banbury Ball, acting on behalf of the employees, made the presentation; and the recipient briefly thanked Mr. Ball and the men for their good wishes, and for their useful gift.

## OBITUARY.

Mr. James Handley, J.P., of Runcorn, died last Thursday after a brief illness, aged 58. The deceased gentleman was connected with many trading concerns about the country; and, among other appointments, he was a Director of the Runcorn and Frodsham Gas Companies and of the Aldershot Gas and Water Company.

The death is announced of Mr. James Broad, a Director of the Lewes Gas Company since its incorporation, who was elected Chairman in September, 1891, in succession to Alderman C. R. Kemp, and has held the position ever since. He was also a Director of the Lewes Water Company. Mr. Broad died yesterday week, aged 76.

**Professor Lewes on "Acetylene."**—Reference has already been made in the "Journal" to the work which Professor Lewes has for some time had in hand on the subject of "Acetylene." The book, as will be seen from an announcement which appears elsewhere, is now ready, and we have received a copy from the publishers, Messrs. Archibald Constable and Co., Limited, of Westminster. It is a goodly volume of nearly a thousand pages, with 228 illustrations; and, pending the fuller notice which we purpose giving in an early number, we may say that it appears to fully justify its title as "A Handbook for the Student and Manufacturer." The author has dealt with the matter with his customary thoroughness. At the end of the text (reference to which is assisted by side notes in red) is an appendix of useful data; and there is a good index. The book is well printed and bound.

**The Wastefulness of Present Means of Illumination.**—Writing on this subject in "Cassier's Magazine," Dr. John Henderson remarks that when the great increase in efficiency of the steam-engine and dynamo of the present day, as compared with twenty years ago, is contrasted with that of our sources of artificial light, it must be acknowledged that very small advance has been made. He attributes this unsatisfactory state of things largely to the fact that the true nature of the phenomenon of light itself has been demonstrated by physical science only within very recent years; and a thorough knowledge of the nature of any phenomena to be reproduced must in all cases precede any satisfactory and efficient production of them. Dr. Henderson tells us that, under the best conditions obtaining at present, out of every 100 tons of coal delivered at gas-works or electric light stations, something like 98 tons are, as far as the production of light is concerned, absolutely wasted, and go to produce useless heat. When one considers the enormous quantity of coal used annually for the production of artificial illumination, the absolute waste of 98 per cent. of it seems to him little short of criminal. As to the solution of the problem, to his mind the prospects are at present far from being bright. He thinks some means must be found of exciting ether vibrations between the visible limits only, and of eliminating the slow radiant heat waves. He acknowledges that the problem has already been solved on a small scale by the firefly—the most delicate measurements having failed to detect any radiant heat in the light emitted by this little creature.

## COMMUNICATED ARTICLE.

### THE QUESTION OF AN EXPORT DUTY ON COAL.

By a Correspondent.

Some two months or more ago, I was given space in which to shape a few arguments designed to show the inadvisability, from a commercial point of view, of imposing a duty upon the exports of coal from this country. Since then, the quantity sent abroad has continued to increase; and proposals to tax such exports, or even to entirely prohibit them, continue to be made by increasing numbers of more or less intelligent individuals—many of them speaking with the authority of reputation, others with the irresponsibility of hitherto unheard-of persons. A proposal for the prohibition of all coal exports "till the price within the United Kingdom has fallen to a figure which will make it possible for every British hearth, whether in mansion or cottage, to have a good fire in it next Christmas Day," put forward by a Mr. George Griffiths in a contemporary, was quoted in the editorial columns of the "Journal" recently, with the comment that it would be interesting to hear it criticized by an expert or two. I am very far from laying any claim to be an expert in economics; but perhaps I may be allowed to note some points that have occurred to me in considering this suggestion and one or two other pronouncements that have been recently made upon the same question of coal exports.

Now the autocratic yet benevolent sounding proposal of Mr. George Griffiths can, I think, be made to appear in its true light pretty easily. If it be intended merely as a temporary measure by which Parliament should decree that the whole of a trade of a present annual value of £30,000,000 to £40,000,000 sterling, employing a vast amount of shipping and labour, and the stoppage of which would dislocate the business not only of this, but of every other country, should be arbitrarily suspended until, but not after, the time when the price of coal had fallen to some undetermined level of cheapness (how it adds attractiveness to clap-trap to bring in the cottager's Christmas dinner!), then it can be dismissed as so absurdly unpracticable and unreasonable as to stand condemned by its own exposition. If, on the other hand, it be put forward as a proposal for a permanent measure designed to keep the price of coal always upon the said undetermined level of cheapness, it may be pointed out that, while it might temporarily achieve the desired object, it would entirely fail of permanent effect.

For, if the coalowners knew that all foreign markets were finally closed to them, they would, as surely as night follows day, reduce the output of coal correspondingly. At present, the object of the collieries is, put broadly, to supply home *plus* foreign demands. Special circumstances have rendered the existing arrangements for output inadequate to meeting these demands, and the result is dear coal until equilibrium shall again be established. Supposing that, as is now suggested, the only market to be supplied were the home; then the output arrangements would be certainly made upon the basis of the probable requirements of that market. Let there come then a sudden and unforeseen expansion of the iron and steel trades; the supply of coal would be found inadequate; up would go the price to perhaps higher figures than the present; and where would the British cottager's hearth fire on Christmas Day be then? If Mr. George Griffiths had known anything at all about the history of previous coal "famines," he would have been aware that the shortage of coal in 1872-4 was due entirely to the sudden increase in home consumption, and that even if coal exports had never been known, the price of coal in 1873 would just as surely have reached the level at which in that year it stood, when "Punch" depicted the millionaire inviting his friends to come and share his fireside.

From considering such big-sounding, problem-off-hand-solving suggestions, it is a pleasure to turn to the arguments of a man of the informed and independent judgment and opinions of Mr. Frederick Greenwood. While it is often, as now, possible to disagree with Mr. Greenwood's views, it is never possible to consider them without profit; and in these days when the public demands to be told, no matter how incorrectly, all about everything, how comparatively seldom it is that one meets with a journalist who only writes that which he himself thinks upon subjects which he understands! Mr. Greenwood first contends for the theory—so beloved of the man who is a "Free Trader, *but*"—that free trade is not to be considered a fixed policy but a "variable expedient." Certain articles of common consumption, he says, "are excepted from the system, for revenue purposes; the choice of them for those purposes being determined, not by economic considerations alone, but by others—political, social, and moral." Why, then, should not the export of coal be numbered among our free trade exceptions? Surely this is a fallacious argument. The revenue duties on the certain articles of common consumption referred to are not in any way an exception from our system of free trade; for our customs and excise duties are only imposed upon those articles of common consumption—tea, cocoa, tobacco, wines, &c.—which cannot be produced in this country. There is, therefore, no "protection" involved in their imposition. The great principle of free trade as regards imports is that the price of home-produced articles of consumption should not be enhanced by the "protecting" of home trade against foreign competition. The revenue duties quoted by Mr. Greenwood are no exception to this principle. We may therefore consider that the question of coal exports stands for judgment by itself, and cannot be prejudiced by imaginary infringements of our free trade system.

It is, of course, obvious that an export duty on coal would not have a direct protective effect; for its first, though, as I have contended, not its permanent, effect would be to reduce the price in this country. But, as the "Spectator," in a very able and cool-headed article on the subject, remarks, "the ultimate effect would be a limitation of imports in whose production the exported coal was used, which is virtually a form of protection." That is to say, if an export duty were imposed upon coal, the cost of those goods requiring coal for their production which we at present import from the countries buying our coal would be increased; and the result would be to enable home producers of similar goods to charge the consumer a higher price. That is indirect protection.

In these days, however, when there has arisen a generation that knows not the real why and wherefore of free trade as a complete and defensible system—the generation of "free traders, but," as I have called them—it is necessary to do more than show that a proposal is protectionist in its tendencies; one has to show in what way those tendencies would injure the nation's prosperity. When it is the question of an export duty on coal that is to be debated, it is necessary to consider it on two different hypotheses; for the advocates of such a duty fundamentally differ as to its result. Mr. Greenwood throughout his article assumes the imposition of a duty sufficient to prevent the drain on our coal resources involved in the demands of foreign countries. On the other hand, Professor Hull, in his recent address to the Victoria Institute, argued in favour of a 5s. per ton duty, estimated to bring in £10,000,000 a year, "which might go to the relief of our increasing taxation, or form a sinking fund with the same object in view." Such an argument, of course, excludes the possibility of the duty reducing or stopping the export; and, indeed, Professor Hull makes his position quite clear: "Nor do I believe," he says, "that such a duty would have an appreciable effect in diminishing the output from the mines." My point is not as to which view is the correct one—though as against Professor Hull's opinion one might put the fact that, according to a Foreign Office estimate communicated to the Cardiff Chamber of Commerce, American coal can now be delivered at Naples for $6·50 as against $7 for Cardiff coal—but rather that it is necessary to consider the effect upon the trade of this country on both hypotheses.

To take the more probable and more popular view first, What would be the effect of prohibiting the exportation of coal? Here, again, two quite different possibilities must be considered. Mr. Greenwood, and most writers, assume that, by prohibiting the export of coal, we should thereby husband our stock. But is that so? It is clearly arguable that the only result might be the possible saving of so much coal as is bought by foreign countries for the use of their navies; while the resulting influence on the prosperity of the bulk of the population of this country would be disastrous, whether any such saving were effected or no. I will try and make that clear.

With the coal we export, we pay for goods we import; those goods comprising (1) food supplies, (2) raw material for manufacture, and (3) manufactured goods. The first we must import, or starve, or employ our coal miners to farm land which cannot produce corn as cheaply as we can buy it from abroad. The second we must import, or correspondingly reduce our business. The third we must import, or make the goods for ourselves—more dearly than we can now purchase them from other countries—using in their manufacture the coal which we now export to those other countries. Choose which alternative you like, is it obvious that prohibition of coal exports would benefit the nation? But more follows. Cease these exports and the shipping trade will no longer earn the freight thereon; and, as a result—vessels having to go in ballast where they now go with coal—higher freight will be charged on goods brought thence, the higher cost coming out of the consumers' pockets. Moreover, if the result of prohibiting the export of coal simply meant the use of more coal at home to make goods formerly imported, where would the economizing of our stock of coal come in? Yet that is Mr. Greenwood's ground for recommending prohibition. The fact is that, if you cease exporting 50 million tons of coal, you must either use that coal yourself less profitably than you could sell it, or cease to raise it, and, thereby, throw out of employment 150,000 men and all those who earn their living by feeding and clothing them, at the same time reducing the national income by the value of that 50 million tons of coal.

To turn now to the second alternative result of imposing an export duty of 5s. on every ton of coal, Professor Hull thinks the trade would not in consequence be reduced, but that the Exchequer would reap £10,000,000 a year from foreign sources; the foreigner being absolutely the only one the worse for the transaction. But, granting Professor Hull's very doubtful hypothesis as to the maintenance of the rate of export, is coal the only commodity in which we have dealings with the said foreigner? Do we not buy with that coal his goods? And if the cost of living and of manufacture be increased to the foreigner by £10,000,000 per annum, shall we not get ten million pounds' worth less of his goods for our 40 million tons of coal? And how then shall we benefit?

It is absolutely impossible, I submit, to lessen or tax our export coal trade without correspondingly diminishing our own

prosperity. The whole question is, shall we deliberately determine to be less prosperous now in order that our descendants a century or two hence shall not find the mines exhausted; and who can tell but what, by that time, water-transit may be so cheap that we can import coal from (say) China, at next to no higher cost than we can now mine it? We are told, on credible authority, that China possesses enough coal to supply the whole world at its present rate of consumption for 3000 years. That coal lies near the surface; and labour in China is absurdly cheap. Need we fear to be prosperous now, for fear of what may happen a century hence?

Mr. Greenwood cries out for a Commission on the question of our coal supplies; and it will certainly be needed to remove public apprehensions if it be continuously asserted, as it is by Mr. Greenwood, that the present high prices are in some measure due to the depletion of our coal resources. He says: "They who should know tell us that little of the better sorts will be left before long; and many a householder has become aware that there is such rubbish in the market now as was never seen till lately, which may be safely taken for a sign." It may; but not for the sign Mr. Greenwood thinks. It is a sign that good coal is scarce *in the market;* not that it is scarce *in the coalfields*. That is my answer when Mr. Greenwood asks what "knowledgeable and trustworthy soul" will assure us that a diminished store of such coal as is most serviceable to a nation of seafarers and manufacturers has nothing to do with the present high price. I rely for my certainty on the point upon those "knowledgeable and trustworthy" souls, the Royal Commissioners who reported on our coal resources in 1871. It is obvious, however, that another Coal Commission is wanted, partly to soothe public nerves, and partly to supplement the information contained in the report of 1871. For, although one can, on the strength of that report, and of knowledge that can be gleaned from any coal mining expert, confidently declare that scarcity of good coal in the mines has nothing whatever to do with present prices, it would be well for the public to have more definite information as to how long (*a*) our cheap, and (*b*) our steam, coal will probably last.

The second of these points brings me to that aspect of the coal resources question which is just now being widely canvassed, and with a few comments upon which I must end my lengthy contribution. That aspect, I mean, of the question which is presented by our coal stock considered as a munition of war. That is the consideration to which Mr. Greenwood gives prominence. Coal, he says truly, is, "for England, with a scattered Empire and a vast Navy to maintain, as necessary for defence as shot and shell." Ought we then to sell to other countries who may, in the possible event, use it for the purpose of fighting us, that steam coal which we possess in greater abundance than any of our Continental neighbours, and which is so much more efficient for naval purposes than any other?

The only possible ground on which a decision to forbid such a sale could be based would be that our keeping our steam coal strictly to ourselves would give us a positive fighting advantage over possible enemies. It might, then, be a matter for reference to a Commission to determine whether Welsh coal has an absolutely higher speed-value than any other known coal. If not (and there is every reason to anticipate that the answer would be a negative one—Russia, for one, we believe, possesses first-class steam coal in Sakhalin), then those countries which at present buy Welsh coal for naval purposes, would obtain supplies from other sources cost what it might; and we should be the losers by the diverted trade. The question then, again, merely resolves itself into one of the duration of our coal stock, and takes the form of whether we should lose trade to-day for fear lest in a century or two of time, when conditions everywhere may have changed, we might not have sufficient coal in these islands to fuel the Navy. In considering this aspect of the question, too, it must not be forgotten that our Colonies—New Zealand, Australia, and Canada particularly—have enormous unexhausted stocks of coal, always available for naval purposes.

Mr. Greenwood urges that we are foolish to sell coal to possible foes; and this is an argument at present resounding through the ha'penny Press. But Mr. Greenwood has himself supplied the answer to his own contention in an illustration intended to point the other way. "In the present high demand for arms and the general equipment of war, exportation to the foreigner of half the contents of our arsenals and dockyards would also [referring to the commercial aspect of coal exports] profit the nation in a certain way. . . . But the sale would be intolerably stupid." Why, whatever are we doing day by day but selling battleships, torpedo boat destroyers, rifles, and every other form of munition of war to might-be enemies? Had Birmingham and Sheffield no share in the making of the weapons now in the hands of the Boxers? Let the sensation-mongers talk all they will about the alleged storing of Welsh coal by France and other countries—in the case of France, a tale to a large extent, I think, of "cock and bull"—it is impossible to speak of stopping the export of coal from the political point of view unless we are prepared to deal with all munitions of war in the same way. And who but the maddest of "Jingoes" would propose such a line of policy?

We shall hear repeated demands during the next few months for measures of restriction or prohibition; so the sooner the Government appoint a Commission of men of ability, knowledge, and sense to inquire into the subject, and to, as I feel sure they would, veto all such proposals, the better for the public nerves.

## NOTES.

### The Solution of Naphthalene in Coal Gas.

One would scarcely expect to find mention of the suspension of naphthalene in coal gas in the middle of a description of the behaviour of perfumes in liquid air. Yet this appears in the course of some observations of H. Erdmann. He says that liquid oxygen and nitrogen appear to be miscible in all proportions. A separation into two layers does not occur when liquefied air, as it evaporates slowly in a vacuum vessel, becomes continually richer in oxygen. Liquid air has little if any solvent action on ether, alcohol, and other organic solvents. Various perfumes are appreciably soluble in liquid air; and in spite of the low temperature of about — 190° C., the escaping gases are strongly scented. The vapour tension of high-boiling perfumes must be quite imperceptible at this extremely low temperature; and their evaporation is accordingly regarded by Erdmann as due rather to solubility in the air than to vaporization. Hannay and Hogarth have shown that the vapour of solvents above the critical temperature dissolves non-volatile substances, or those volatile with difficulty, which are soluble in the liquid solvent. Thus, he remarks, naphthalene is retained by coal gas in quantity far surpassing that due simply to its vapour tension. In consequence of the solubility of perfumes in liquid air, it is concluded that they are also retained in an analogous condition in gaseous air. The difference here marked between vaporization and solution in a gaseous medium is noteworthy.

### The Effects of Unsteady Voltage in Electric Lighting Currents.

In a Franklin Institute paper on Electrical Measuring Instruments, Mr. J. F. Stevens emphasizes both the difficulty and the necessity of the attainment of a high degree of accuracy. This exactitude is particularly important in the case of voltmeters, which should be correct within 1 per cent., since a variation of 1 per cent. in voltage means a corresponding variation in candle power for every incandescent lamp which may be in circuit. It is quite well known that the candle power of any incandescent lamp varies directly with the voltage; the variation being approximately one candle power for every volt increase or decrease from the normal voltage of the system. Further than this, a variation of 1 per cent. from normal voltage on a system carrying incandescent lamps, means a variation of about 16 per cent. in the life factor of the lamp, and about 3 per cent. in the watt consumption per candle power. Errors in the indications of ammeters do not produce such serious results; yet it is desirable that they should be accurate in order to obviate the danger of overload on circuit, translating device, or generator. In view of this declaration of the importance of steadiness of voltage in public electric lighting currents, it would be interesting to learn how many local authorities systematically test the circuits by standardized voltmeters, portable or otherwise. The importance to the gas consumer of accurate registration in the case of his gas-meter is evidently less than that of uniform voltage to the user of electric lights.

### The Illuminating Duty of Enclosed Arc Lamps.

The latest photometric measurement of electric arc lamps has been reported upon by a Committee of the American National Electric Light Association. It is reproduced by the "Electrical Review." The lamps tested were all of the enclosed arc variety, this being one of the best approved forms of arc light in general use at the present day. All the old ratings of the illuminating power of arc lights relate to the open, naked arc, which is obsolete. The tests now in question appear to have been well and fairly made under the supervision of the Committee, by an ingenious method devised by Professor C. P. Mathews, which neutralized the differences of power and colour existing between the arc lamp light and the Hefner unit of light used as the standard. The results are as follows, in watts per Hefner (0·875 English standard candle): Continuous current. 110 volts, (*a*) opalescent inner globe, no outer, 2·10 watts; (*b*) opalescent inner, clear glass outer, 2·66 watts; and opalescent inner and outer, 3·04 watts. Alternating current, 110 volts, (*a*) with clear outer globe, 2·62 watts; (*b*) with opalescent outer globe, 3·20 watts. A suitable shade was found to increase the mean spherical tendency of a lamp with a clear outer globe by 50 per cent. The conclusion finally arrived at by the Committee is that, with a suitable shade such as is recommended for invariable use with street lamps, the direct current enclosed arc lamp gives 39 per cent. more useful light than the alternating current enclosed arc, and at slightly greater economy. It will be observed, however, that with opalescent glasses these arc lamps do not yield a higher duty in light from the current taken than the ordinary run of incandescent electric lamps with which we are familiar.

### Dr. Joly on the Geological Age of the Earth.

Dr. Joly, of Dublin, has joined the honourable band of those who have essayed to ascertain the geological age of the earth. This interesting problem has been attacked by a variety of scientific methods, yielding very various results. The enormous lapse of time presumably required to mould the earth's surface into its existing state, on the hypothesis of uniformitarian geology, has been scouted by the followers of physical science, who have demanded, in the name of the doctrine of the conservation of

energy, that the geologists should hurry up their phenomena. Professor G. H. Darwin tried to oblige in this direction, by framing his hypothesis of magnified primeval tidal action; but the suggestion has been questioned. Now Dr. Joly has tackled the problem in a new way. Starting with the assumption which underlies all modern theories of cosmic action—that the denudation by solution of the land surface, since the formation of a solid earth crust, has been on the whole a uniform process—it is further assumed that the cause of the saltness of the ocean is the sodium for the most part carried into it by rivers since the land surface first became exposed to the action of solvent denudation. The whole of the water on the earth's surface must clearly have originally been pure condensed moisture. If, now, we can obtain a correct estimate of the amount of sodium at present contained in the waters of the ocean, and also of the amount annually supplied to the sea by rivers, we have the requisite data whereby the earth's geological age may be computed. On the best available estimates, Dr. Joly finds that the mass of sodium contained in the ocean amounts to $15{,}627 \times 10^{12}$ tons. In estimating the amount of sodium carried annually by rivers into the sea, Sir John Murray's analyses of nineteen rivers are accepted, and a result of 24,106 tons of sodium per cubic mile of river water is arrived at. The same authority is followed for the annual river discharge into the ocean, amounting to 6524 cubic miles. These figures give the mass of sodium annually carried to the sea; and this, divided into the total mass of sodium contained in the ocean, gives a grand result of 94,800,000 years, representing the duration of geological denudation. Of course, such a determination is open to all sorts of corrections; but it is an interesting attempt to solve the problem of the age of the solid crust of the earth from what appears an altogether novel standpoint.

### The Noise of Working Machinery.

A suggestive article recently appeared in the "Engineer," drawing attention to a generally overlooked consideration in regard to the noises produced by the working of machines. It was observed that, if it were possible to calibrate it, sound might be found a not very indifferent method of measuring power. Mechanics are so accustomed to regard sound as the natural accompaniment of mechanical motion, that the fact of its being a monitorial voice, ever telling of energy wasted, usually escapes attention. "The noise of running wheels, of moving water, the crackling of a belt, the hum of a dynamo, the rattle of a motor-car or a railway train, are as sure indications of energy resolved into a useless form, as the crash of broken crockery and the lamentations of a careless servant." The truth of this observation only needs to be stated to be admitted. Indeed, it might be said with much justice that the path of mechanical improvement, as of material civilization, lies along the way of silence. All barbaric doings are noisy; and the attainment of a quiet manner of working is a hall-mark of efficiency. The human ear is of little value as a measuring instrument; but as a detector, even in mechanical matters, its value is scarcely appreciated sufficiently. Yet knowledge of the meaning and gravity of the indications afforded by both ordinary and extraordinary noises in mechanical working is of the first importance to an engineer. There is nothing in the nature of motion to necessitate an accompanying noise; but movement is generally noisy. The nuisance of knocking in stationary steam or gas engines is the commonest illustration of this. As the "Engineer" remarks upon this kind of noise, a play of a brass on a crank-pin, so small that the expansion of the pin caused by a slight elevation of temperature is sufficient to give rise to seizing, will produce quite an alarming knock when running at a high speed. In these circumstances, it becomes a choice of evils between the tolerance of a knock and working with an easy bearing. The gas engineer has learnt the significance of hissing gas-burners, once tolerated as unavoidable. The silent bicycle has, perhaps, been the greatest teacher of the connection between mechanical efficiency and the absence of noise. The conclusion of the "Engineer" is that noise, like heat, is a form of energy; and we can almost as readily waste power in producing one as the other.

**North of Ireland Association of Gas Managers.**—The annual meeting of this Association will be held at the Town Hall, Sligo, next Tuesday, under the presidency of Mr. C. B. Tully. We learn from the programme issued by the Hon. Secretary (Mr. J. Whimster, of Armagh) that the business will consist mainly of the delivery of the President's Address and the consideration of the motion to be proposed by Mr. S. B. Langlands, of Coleraine, and seconded by Mr. F. Eustace, of Tullamore, in accordance with the notice given at the meeting last year, to change the name of the Association to some such one as "The Association of Gas Managers for Ireland." No papers are down for reading and discussion. Technical matters, however, will not be absent; for the members will be afforded an opportunity of inspecting at work Professor Lewes's methane hydrogen water-gas plant, apparatus for enriching gas with benzol or other light hydrocarbons, and Messrs. Biggs, Wall, and Co.'s "Rapid" charging machine, which will be fully described by the President. The proceedings will be opened at the early hour of nine; and the afternoon will be left free for a drive round Lough Gill, with dinner at Dromahair.

## NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

### The Annual Meeting in Edinburgh.

Last week (pp. 280-82) we reported the general business transacted at this meeting, held the previous Thursday in Edinburgh, To-day, we give the paper read by Mr. W. R. Herring, also that of Mr. Lighbody.

### THE CONSTRUCTION AND WORKING OF INCLINED RETORTS

By W. R. Herring, of Edinburgh.

The construction and working of inclined retorts is a subject which has been prominently before gas engineers for fully ten years. I cannot therefore claim to have anything novel to lay before the members of this Association; but at the request of the Council, I have undertaken to contribute a paper upon the subject, seeing that it has not hitherto formed a part of the transactions of the Association.

The method of constructing an inclined-retort bench is of necessity closely allied to the working of the same; and I therefore propose, in the first instance, to deal with some of the principles underlying the application of the natural law of gravity to the charging of coal-gas retorts.

It is a well-known law that all solid bodies in either an irregular, lumpy, granular, or powdery state have the properties of lying at an angle with the horizontal line when tipped or piled into a heap, and will continue to so lie indefinitely without further alteration of angle, this property being known as the "angle of repose" of the particular substance in question; the angle of repose depending primarily upon the physical characteristics of the substances dealt with.

There are, however, important points which, in a practical way, affect this, as it is possible for substances of varying characteristics to be thrown into a heap, the surfaces of which will assume an angle different from the angle of repose in either a greater or lesser degree, but which, in time, when in a greater degree, will assume the natural angle peculiar to the physical characteristics of the substances dealt with; this apparent change from the natural angle of repose being brought about either by the material being tipped or piled gently, inducing it to assume an angle steeper than the natural angle of repose, or by the material being violently tipped, giving it an impetus which induces it to assume an angle lesser than the natural angle of repose.

These conditions affecting the angle at which any substance will lie under different treatment of tipping or discharge have a very important bearing upon the working of inclined retorts, as in this system the force of gravity and the natural angle of repose of the coal are the two factors which we endeavour to employ to supplant the heavy physical exertion accompanying the ordinary process of carbonization in horizontal retorts.

The first factor to be determined, therefore, is the angle at which the retorts are to be placed in the settings. In determining this, we must take into account the differing classes of coal that have to be dealt with, and their physical properties; bearing in mind that the proportion of the various classes may vary from hour to hour during the day. The physical characteristics of different coal when under the process of carbonization must also be carefully noted. Some coals have the property of assuming almost a liquid mass during the process of carbonization. Such a coal is about the worst one could have to deal with in the inclined-retort system, for the simple reason that anything assuming in the slightest degree a liquid or plastic state will of necessity have a tendency to flow down the slope of the retort and bring about what is commonly defined as "creeping." There are fortunately very few classes which assume this character when under the process of carbonizing; and even those that do can be easily checked in this tendency by an admixture of about 25 to 30 per cent. of a coal which does not possess this plastic property when under heat.

Some confusion has arisen in the discussion upon the question of the movement of the charge within the retort, which is somewhat involved in the preceding remarks with regard to coal of a plastic property. It is alleged that, although the charge is perfectly level in the first instance, upon opening the retort some while after carbonization has proceeded, it has been found that the charge has slipped down the retort and banked at the lower end—and this when it has not been a caking coal—and moreover the same coal will frequently charge perfectly uniformly and remain so, but that occasionally it slips forward with undesirable consequences.

It appears to me that this arises from an acceleration in the speed of charging. In other words, that the charge, although in the first instance level, has been run into the retort at such a rate that the same is to a certain extent under pressure; and in consequence of the slight vibration brought about by the evolutions of the gas from the coal, the charge slips forward. The great variations in the disposition of coal when charged into sloping retorts may be better illustrated by considering two extreme cases. For instance, "nut" or "chirl" coal is the most lively that one could have to deal with in connection with an inclined retort. On the other hand, the Durham or fine Newcastle coal, which is practically all dust, is the slowest coal, particularly if the latter is a little damp. Between these extremes there are numerous varieties; and it is not practical to put up an installation which can provide for many differing

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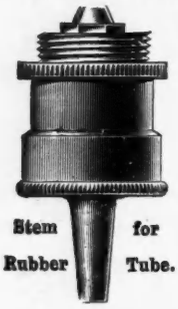

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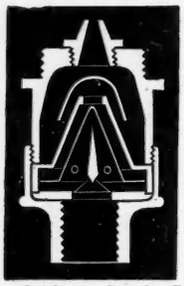

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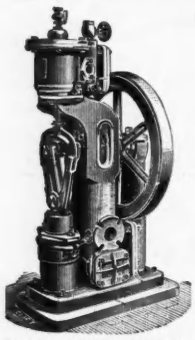

Fig. 706. "SINGLE RAM" STEAM-PUMP.

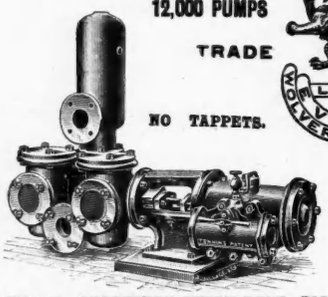

Fig. 598. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

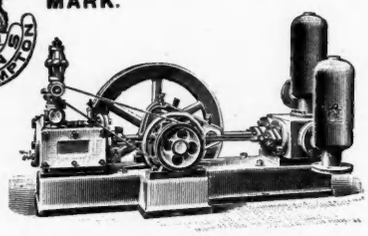

Fig. 685. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

Fig. 712. "DOUBLE-RAM" STEAM-PUMP.

# A NEEDFUL NOTICE

## TO ALL WHOM IT MAY CONCERN.

We hereby intimate to Chairmen and Members of Gas Committees, Engineers and Managers of Gas-Works, that we have **PURCHASED THE BUSINESS AND PATENTS OF THE AUTOMATIC COAL-GAS RETORT COMPANY, LIMITED,** Westminster, London, and are now the Sole Owners of the Patents of the pre-eminently successful system of Self-Acting Conveyors and Elevators in combination with the Storage Hoppers, the Measuring Chambers, and the Charging-Shoots, forming together the much admired and happily-designated "powder-pouch" method of charging Inclined Retorts, now in operation, or in course of erection, at—

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classes of coal, or many different characteristics of the same coal, simply by adjusting the angle of the retort.

Under the circumstances, therefore, in determining such a construction, the prime factor is to be sure that the angle is no greater than that at which any possible class of material that is likely to be used will lie during the process of carbonization; and while this angle can be determined approximately by experimenting with cold retorts, it must be borne in mind that the tendency in a hot retort is to accelerate or assist the coal in its travel down the retort during the charging operations.

Experience has proved that an angle of 32° is the most suitable for all descriptions of common or splint coal. I find, however, that this angle is too steep for the shales and cannels when worked alone; but when mixed in proportions to produce a 25-candle gas—namely, about one-third of cannel to two-thirds of first-class splint coal—the angle of 32° is equally suitable.

Several attempts have been made to increase the angle of the retort to such an extent as to facilitate the discharge of the coke; but as the angle of repose of coke is much greater than the angle of repose of the coal, it is impossible to reconcile the two conditions. It is absolutely necessary that the angle of the retort should be such as to permit of the coal lying evenly on the bed of the same without moving. Such an angle, in the majority of cases, is insufficient to induce the coke to run without some exterior force being applied. At the outset, however, the mere pricking of the charge with a poker from the lower mouthpiece is usually sufficient to induce the coke to run from the retort, particularly if the cross section of the retort has been such as to permit of the free expansion of coke without wedging in the crown of the same. In other cases, the man attending to the charging appliances, by means of a T-headed rake, gives the charge a push from the upper mouthpiece, which generally results in the free discharge of the retort.

Personally, I have never given in to the claim that the system is automatic or self-discharging; but I do maintain that the slight labour involved in using the pricking rods or tickling bars, particularly with the men working at the back of a screen, as at Huddersfield, considerably lessens the physical labour and exertion on the part of the attendants—the coke hitting against the screen and falling beneath into the waggons, where it is quenched and removed from the retort-house by any of the well-known mechanical means. It would undoubtedly be an advantage if the labour involved in the discharging of the retort could be entirely done away with; and in order to attempt this, the author has designed an appliance which is intended to give the coke a start from the upper mouthpiece by means of a plunger projecting into the retort and travelling 6 or 8 feet down the same—the motion being such as to give the coke a swinging start, as once set in motion the coke will clear itself from the retort quite easily.

Having determined the angle at which the retorts are to be constructed, the next most important point is the charging appliances, which conduct the coal from the overhead storage hoppers to the charging mouth of the sloping retort.

It will be readily appreciated that the speed or the rate of travel of the coal at the point of issue into the retort mouth must have a considerable influence upon the charge laid within the retort. The speed should be no more than sufficient to allow the coal to gently flow down the retort, coming in contact with the stop at the bottom, and building itself up to a depth in proportion to the height of the stop, and continuing this depth throughout the length of the retort. Given such a condition, the height of the stop regulates the thickness of the charge in the retort. Any unnecessary impetus given to the coal causes it to bank in the lower end of the retort, and results in an imperfect charge throughout its length. On the other hand, a slow feed may result in the coal trickling down the retort and having insufficient force to layer itself to the proper thickness, with the consequence that the retort is undercharged and the coal chokes at the upper mouthpiece. Here, again, it will be seen that it is by no means a simple matter to always depend upon the ideal being accomplished, in consequence of the greatly changing conditions of the material to be dealt with from hour to hour.

The impetus attained by the coal at its point of issue into the retort is derived from its fall from the overhead measuring chamber, or whatever other appliance may be used for gauging the charge for each individual retort. The system of setting retorts in three or more tiers each varying in level, of necessity gives a varying drop for the coal, and, if unchecked, a resulting accelerated rate of travel at the point of issue into the retort. The charging appliances therefore play a very important part in the successful working of the system; and various devices have been introduced to overcome the difficulties consequent upon the varying conditions which prevail.

At the outset, one might almost despair of ever reconciling these diverse conditions; and, in practice, it is not possible to arrive at that state of efficiency which too many of us anticipate in the introduction of any new methods to supplant existing processes. The defects and drawbacks of older methods are lost sight of or forgotten; but the slightest defect in the new process is enlarged and magnified in consequence of it being a human failing in the higher species to anticipate and strive for perfection until we are convinced by hard facts of the impossibility of attaining it. From a practical point of view, however, something very near perfection has been attained when due regard has been given to all the conditions necessary for the successful working of the system.

As is well known, the innovation was first introduced at the works of the Brentford Gas Company in 1889. In 1891 and 1893, the author constructed installations at the Huddersfield Gas-Works equal to carbonizing 400 tons of coal per day. Since this plant was put to work in 1894, the whole of the coal gas manufactured in Huddersfield has been produced from inclined retorts. Prior to the introduction of the newer system, the wages for carbonizing cost 3s. 4·19d. per ton manipulated; whereas during 1899 exactly similar costs were only 1s. 9d. per ton, this system working on retorts 15 feet long.

The Brentford Gas Company's works, as far as the author knows, are the only other works of any considerable size where the whole of the gas has been produced from inclined retorts for some years past; and upon reference to "Field's Analysis," I find that, prior to the introduction of inclined retorts, the Brentford carbonizing wages were 3s. 5·35d. per ton of coal, whereas for the last completed financial year they were 1s. 11·8d. Thus, in the case of Huddersfield, showing a saving of 1s. 7·19d. per ton of coal, and Brentford 1s. 5·55d. per ton of coal. These figures are sufficient to satisfy any commercial man that the system possesses advantages which have not hitherto been accomplished by any other improvements in carbonizing plant, and are sufficient to warrant the most serious attention being given to the system by any gas engineer contemplating an extension of his carbonizing plant.

At the present time, there are about forty or more installations working in various parts of England. Many in the first instance cannot be said to have been an unqualified success; but by far the greater number of them were deficient in consequence of the inefficient heating of the sloping setting of retorts. The altered conditions and difficulties of heating a retort setting placed at an angle of about 32° not being sufficiently appreciated in the first instance, rendered many of the settings deficient in heat at the lower fronts, where, owing to the tendency of the coal under certain conditions to bank, the greatest heat is required.

The form of the cross section of the retort has a very important influence upon the easy discharge of the coke after the process of carbonization is completed. The usual form of retort adopted for the newer system has been the ⌂, with the radius line of the crown springing from a point 2 or 3 inches above the floor of the retort, as shown on diagram No. 1. Diagram No. 2 shows the cross section applied by the author to the second

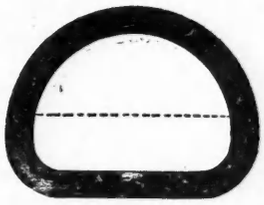

Fig. 1.—Section of Ordinary ⌂ Retort.

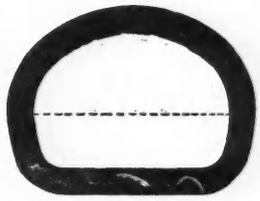

Fig. 2.—Improved Section of Inclined Retorts.

installation at Huddersfield; but owing to an error on the part of the makers, this was not strictly carried out. The same diagram also illustrates the cross section of the installations which have been put up in Edinburgh, and which are to be put up at Granton. It will be seen on reference to diagram No. 1, that the breadth of the retort is gradually reducing from a line about 2 inches above the base. The thickness of the charge in the retort is approximately 6 inches; and, as a consequence, if the coal has the slightest tendency to expand or "cake" during the process of carbonizing, the coke becomes jammed in the retort, and requires considerable labour to induce it to run down the slope.

On reference to diagram No. 2, it will be seen that the sides of the retorts are opening outwards to a point 7 inches above the base. Any expansion in the coal therefore rises into a larger space than formerly occupied, and absolutely avoids the jamming of the coke, not only permitting of the easy discharge, but saving the wear and tear of the retort to an extent greater than might at first sight appear, as the bursting pressure of the expanding charge in the retort must go a long way towards pulling a setting to pieces, when we remember that this pressure is applied from four to six times every 24 hours. Care must be taken in the making of the cast-iron mouthpieces that the section is continued throughout, otherwise the advantages are neutralized by the jamming of the charge in the mouthpiece.

While on this subject of the discharge of the coke, I might with advantage point out the necessity of the careful jointing of the retorts in the settings; the slightest imperfection in the joints having considerable influence upon the uniformity of the charge, and also the discharging of the retort.

Another small point, but of equal importance, is the means used to support the stop in the mouthpiece. In many cases, an ordinary square bolt-head is inserted through the base of the iron mouthpiece, against which the raking bracket at the back of the stop is made to rest. Whatever tendency the coke may have to run down the retort is completely stopped by this projection, about ¾ inch high. A slight pocket should be cast in

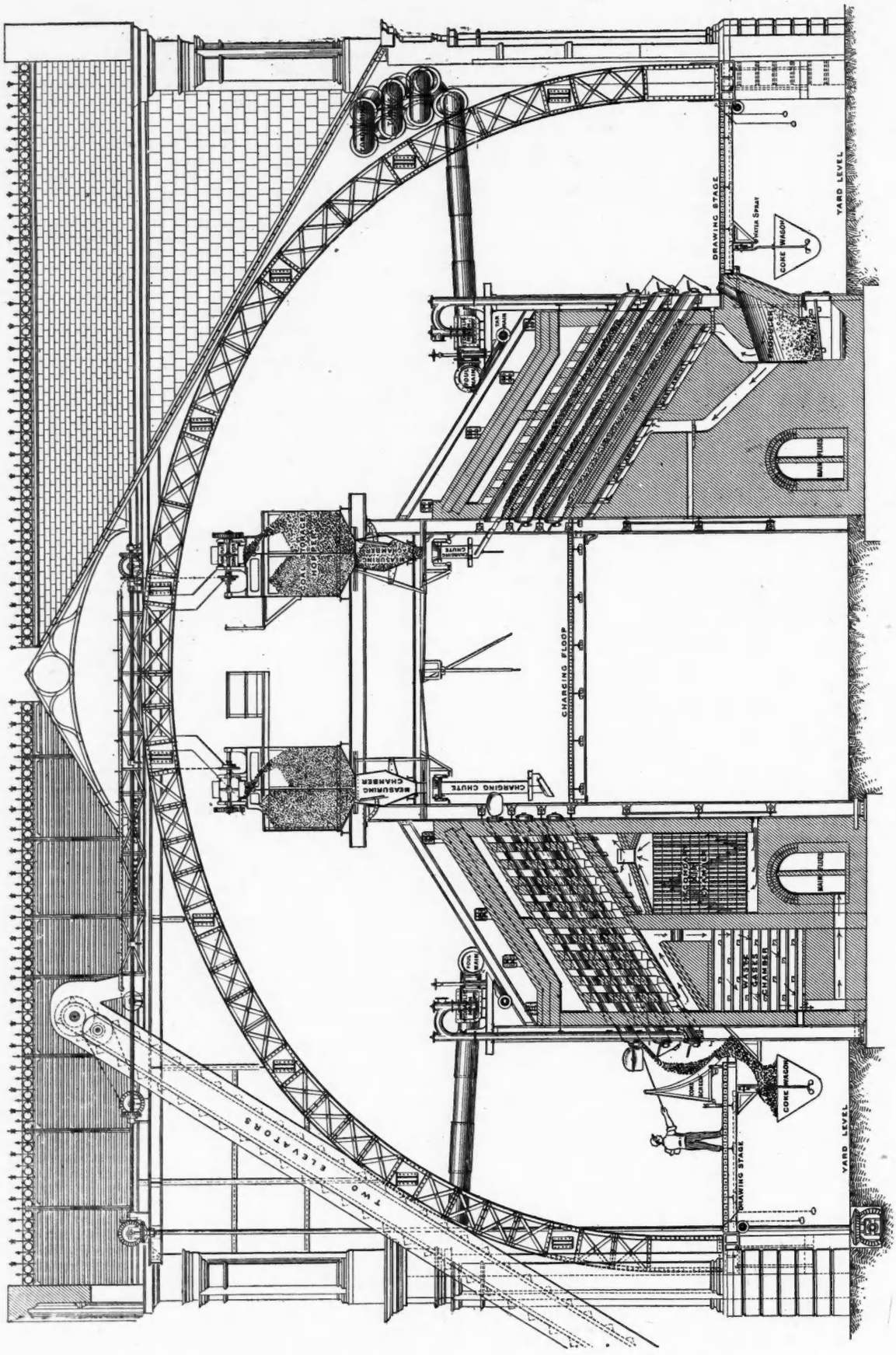


FIG. 4.—EDINBURGH AND LEITH CORPORATIONS GAS COMMISSIONERS—INCLINED RETORT BENCHES.

the mouthpiece for the iron bar to rest therein, as shown upon the general drawing.

All the general principles underlying the construction of a horizontal retort-bench, furnace, and settings are applicable to the construction of an inclined retort installation. The brickwork of the bench should be built entirely on the horizontal line, the top of the division-walls being stepped back—about half brick steps being sufficient to bring about the angle for the construction of a sloping arch. These should be coped with fire-clay blocks, the bottoms serrated to fit in the horizontal steps left in the upper parts of the side walls, and the tops sloped to the required angle (about 32°), and also sloped on either side to form a skewback for the arch. It makes a stronger construction to build the front portion of the arch on the horizontal line for a length of about 2 or 3 feet inwards, and then to form the sloping arch, keying the same into it—the radius of the front portion being somewhat less than the radius of the sloping portion, in order to get them to key and form a satisfactory line. The arch of the setting is best formed of special bricks 9 inches square, moulded to the radius to suit the particular form of arch adopted. The construction of the furnaces and the regenerative chambers should be entirely upon the horizontal line, as also the brickwork in the setting between the retorts; the beds for the retorts being formed by inserting splay bricks where necessary.

The old system of constructing retort-settings with specially formed fire-clay blocks is, I think, well worthy of being again revived, particularly with regard to the settings of inclined retorts. The difficulty of getting the bricks in the vertical division-walls of the setting cut to the slope of the retort entails a large amount of labour, and but imperfect work at the finish.

In connection with the settings which I have recently constructed, and also for the new works at Granton, I have arranged for their being entirely built with specially formed fire-clay blocks and shields; the one setting that has been constructed with these has proved to be eminently satisfactory and most easily constructed—in fact, it almost ceases to be anything more than a handy man's work to construct the setting. The original models for these blocks, however, must be made from an actual setting of retorts—that is to say, the retorts must be placed in position and proper models made in (say) plaster of Paris, and these duly fitted and registered. I have found that twelve different patterns are sufficient in one setting, and that 700 different pieces are sufficient to complete the setting. Where a greater degree of heat is encountered in the vicinity of the gas-ports, these blocks can be of a material to withstand the greater heat.

To facilitate the equal heating of a setting of inclined retorts, it has been found advantageous to divide the setting into practically four quarters; the central division-wall completely dividing the upper from the lower half, as is usual in horizontal settings, and each half being likewise divided from front to back and under the control of its dampers on either side, there being therefore four waste-heat outlets from the one setting. The circuit of the heat around the retorts can be varied; but it is better to finally draw the heat from the setting in the case of the lower half to the front walls, and in the case of the upper half to the middle division-wall—that is to say, downwards. This tends to produce a more equal pressure throughout the setting. It, however, applies more particularly to the lower half. Provision should be made for considerably increasing the heat in the lower portion of the front half of the setting by means of a couple of spare ports from the producer, each covered with a damper; the damper covering both the gas-port and the secondary air-port. The object of this is, in the event of getting a series of bad charges (from accidental causes which do arise from time to time; the coal lying in the lower end of the retorts), to draw these dampers to whatever extent may be necessary, and give an extra supply of heat to work off the extra thickness of coal which has accidentally accumulated.

The producer charging door should be so arranged as to permit of the coke being discharged from the retort direct into the producer by means of a portable shoot. Without this provision, the labour of charging the producers is unnecessarily excessive; and I know of one case where it formed the most expensive part, and cost more than the drawing and charging of the retorts.

The general arrangement of the retort-bench is best when it starts from the yard level. The old idea of sinking the furnace basements into cellars below ground, rendered light and ventilation and comfortable working an impossibility. It is far better to start from the yard level, building the stage as high as may be necessary above it, but providing an abundance of air-openings in the side walls beneath the stage level for the purposes of light, ventilation, and easy supervision.

We all know the importance of securely bracing a retort-bench to prevent the expansion and contraction destroying the structure in a short period of time. The necessity of efficiently bracing is doubly important in the construction of an inclined retort bench. In the first place, it is of necessity a larger structure; in the second place, there is the tendency for the structure to move downwards as a result of expansion, and never recede to its former position.

From a glance at the diagram, it will be seen that the steel structure seems part and parcel of the building itself. As a matter of fact, the brickwork of the bench, although supported and restricted by the structural ironwork, is entirely independent of it, and could be completely pulled down and renewed at any time without disturbing the ironwork. The buckstays, hydraulic mains, foul mains, and all other parts remaining exactly as shown during such an operation—the ascension-pipes and mouthpiece only being removed—the advantage of such a construction is apparent on the face of it. In fact, there is no reason why the structural ironwork of the retort-bench should not also be utilized for the supporting of the roofs over the installation. The diagram attached to the larger plan (fig. 3) shows a method

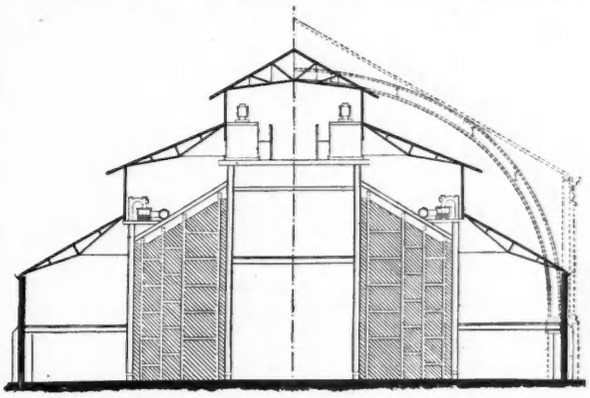

Fig. 3.—Proposed Construction of Roofs supported upon Structural Ironwork for Inclined Retort Bench.

of doing this. Instead of covering with a circular girder roof as shown, the same might be accomplished by covering with short span roofs as indicated. This would not only considerably reduce the height of the side walls of the building, but would appear to make a very much cheaper construction, and is worthy of being closely looked into. The arrangement fig. 4 shows the one about to be erected at Edinburgh at the new works.

The coal is received in railway waggons on sidings running at the general yard level. A pit is formed beneath a double line of rails on the transverse centre line of the retort-house, in which is placed the coal breaking and elevating appliances. The waggon is discharged by means of a hydraulic lift placed between the rails. This, ascending, catches the hind axle, lifting one end of the waggon as a consequence, and emptying its contents upon a traversing plate or picking belt. The speed at which this is made to travel depends upon the class of coal received at the moment, thus regulating the feed to the coal-breaker, where the coal is broken to a uniform size, falling immediately from the breaker into the boot of the elevator. The elevator transports the coal from the base of the pit to the highest point in the retort-house, at which point it discharges on to a pair of conveyors, each of which feeds one of two lines of conveyors at will, running longitudinally with the building. Immediately beneath these longitudinal conveyors, there is a continuous trough or hopper formed, sufficient in capacity to carry about 14 hours' stock of coal. Immediately below the storage hopper, measuring chambers are fixed to gauge the weight of the charge for each individual retort. This chamber is actuated on the old powder-flask principle, by means of a sliding door at the top and at the bottom actuated by one lever, so that when the upper door is open the bottom door is shut. In order to prevent the bye-passing of the coal when the levers are at half stroke, a counterbalance flap is introduced at the bottom of the measuring chamber, which cannot fall and open the bottom port until the bottom slide is fully drawn, and consequently the top slide fully closed. With this arrangement, it is possible to regulate the weight of the charge over a lengthened period of time without its varying more than a few pounds every time the chamber is discharged. The coal is conducted to the upper mouthpieces by means of a traversing shoot (one shoot being provided for each tier of mouthpiece), within which provision is made for baffling the fall of the coal so as to permit of a steady flow into the retort. The settings at present constructed at New Street are working four charges of 7 cwt. each charge, and, as before explained, are constructed with fire-clay blocks and Glenboig retorts.

I find that when carbonizing shale and cannels alone we have some difficulty in maintaining the full heat necessary for any lengthened period of time. This is perhaps accounted for by the depreciation in the quality of coke going to the producers, and also by the greater heat required in obtaining the gas from the cannels and shales. When mixed, however, in the proportions of 33 per cent. of cannel to 67 per cent. of splint coal, there is no difficulty whatever in maintaining a sufficient heat throughout the setting.

The coke in being drawn from the retorts comes in contact with a traversing screen at the back of which the men work; one screen covering a whole setting of retorts, with three vertical slots in it sufficient to enable the pricking rods to pass through. The men by this means are completely protected from the heat necessarily arising from the fronts of the settings, and the discharging coke. The screen directs the coke, through openings on the stage floor, into waggons suspended on an overhead single line. By means of the water-quenching arrangements shown, the men on the stage floor can open the valve and allow the

coke to be quenched in the waggon without going to the ground floor; the steam arising passing up the fronts of the settings clear of the operators. These waggons are drawn from the retort-house by means of a continuous wire-rope; and it is intended that they should pass up an inclined plane to the overhead arrangements which are to be put down for the stacking of the coke in the yard, or the discharge of the same over screens into railway waggons.

The greater part of the condensing appliances are contained within the retort-house; the lines of pipes being nestled within the triangular space above the haunches of the main girders of the roof. It should be noted that the gas-main passing from the foul main at the back of the hydraulic mains has a gentle rise, and continues to rise throughout the seven lengths of 20-inch piping running the full length of the retort-bench. This same system is carried out at Huddersfield, and was found to yield considerable advantage from an absorption of some of the lighter hydrocarbons by the gas—the lighter oils depositing from the gas as they cool flowing in the reverse direction to the stream of gas, the hot gases taking up some of the lighter vapours—not only producing a somewhat higher illuminating power, but tending greatly to bring about uniformity in the quality produced from hour to hour. From this point, the gas passes through the exhausters, and finally through water-tube condensers and through the other general routine, which my present paper will not permit of my dealing with.

I may perhaps mention, however, that it is my intention to construct within the inclined retort bench at present working at New Street—when the same requires re-setting—a setting of retorts similar to that shown on diagram No. 5. The size of

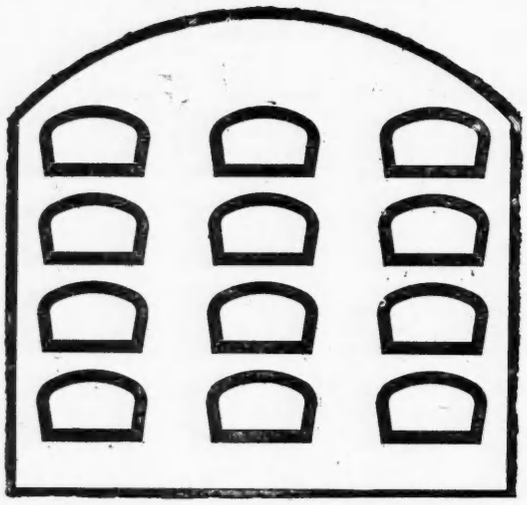

FIG. 5.—DIAGRAM SHOWING PROPOSED SETTING OF TWELVE 22 IN. BY 12 IN. RETORTS, TO BE CONSTRUCTED WITHIN AN EXISTING SETTING OF NINE 22 IN. BY 15 IN. RETORTS.

the archway is, of course, the same as is at present occupied by nine retorts; but it is my intention to try the form of retort shown, and put in a setting of twelves. Whether this will be a success or not, it would be premature to predict. From a practical point of view, however, there does not appear to be any reason why it should not be a success so far as construction and wear and tear are concerned. My only fear is that the heating of a setting working such heavy charges at the rate of six charges per retort per day—in all 25 tons per setting—may be somewhat difficult to maintain.

*Discussion.*

The PRESIDENT said they would all agree with him that Mr. Herring had given them an intellectual treat. He had gone over a field that was new to them. For many years he himself had been making inquiries regarding installations of inclined retort-settings; but there was always something wanting in the information he obtained. They had now before them a complete treatise on the construction and working of inclined retorts. Mr. Herring was the first to introduce inclined retorts in Scotland, by way of experiment; and he was so confident of the results that he was now putting up one of the largest installations in the world. He was sure, from the drawings that were before them, that it would be one of the finest. Mr. Herring, he had no doubt, would be very pleased to answer any question in regard to the different points he had dealt with.

Mr. H. POOLEY (Dunfermline) said that, in the month of March, he reported to his Commissioners on the subject of sloping retorts, along with others; and his opinion in regard to such retorts was that the capital cost of them was very high. He should like to ask Mr. Herring to give them some approximation of the capital cost per mouthpiece, and also to ask him whether he was right in saying that it came to about £120 or £130. This figure was at least 60 per cent. more than the cost of regenerative settings. Then he found that for a works of the size of those at Dunfermline, where the difference in the manufacture in the summer time was so great—their minimum being 70,000 cubic feet, and their maximum over 500,000 cubic feet—there really was nothing in sloping retorts as against retorts set on the regenerative principle.

Mr. A. MACPHERSON (Kirkcaldy) said that, like Mr. Pooley, he certainly thought the cost per mouthpiece was one that they ought to consider. At the same time, the saving to be effected by the working of inclined retorts must be placed against any extra expenditure of capital; and it was quite possible Mr. Herring might be able to show that the original expenditure of capital would be more than recouped in the saving effected. The thing which struck him more was the angle of repose. Mr. Herring owned that shales and cannel required a different slope from splint coal.

Mr. HERRING: When by themselves.

Mr. MACPHERSON (continuing) said that he was going to ask whether it was necessary to put up a bench suitable for carbonizing shales and cannel, and separate retorts for carbonizing splints and nuts, because they all knew that if they mixed shales of a certain class (and cannel coals) with nuts and splint, they destroyed the coke. In fact, he did not think it would be at all fit to be used in a producer; and consequently they would destroy the value of the coke, both as an article of sale and as a fuel. He certainly agreed with the President in saying that they had had a most masterly communication upon the construction and working of sloping retorts—a subject that was entirely new to them. Like Mr. Pooley, however, he very much doubted whether the system would be suitable for a moderate-sized works yet; and possibly for a long time to come they would have to be content with their regenerative settings. Mr. Herring said he mixed coal in the proportion of 33 per cent. of cannel to 66 per cent. of splint. He supposed Mr. Herring meant by that a cannel having a good coke.

Mr. A. WILSON (Dawsholm) said he thought it was their duty to give Mr. Herring their thanks for the splendid paper he had put before them. It was one of the best they had had for a considerable time. Mr. Herring had gone into the matter most thoroughly, and had made the inclined retort system very clear to them all. In the North, they had not had much opportunity of going into the matter practically. Mr. Herring was about to do that; and he hoped he would give them an opportunity soon of seeing the system in practical operation. The charging, which Mr. MacPherson spoke about, seemed to be the point they all had difficulties about. In the South, where they could get coal of fairly good quality and size, he should think that the inclined retort system would suit very well. When he was in London, at the beginning of the year, he had an opportunity of calling at several of the works where the inclined retort system was in use; and he was certainly disappointed with the charging. It was not at all what they would like to see. In every case it was: "Oh, yes, we have not got the coal that we have been using," and excuses of that sort. They would perhaps go over half-a-dozen of the retorts, and they would find the charges splendid; and then they would come upon three or four retorts where the charge was either at the top or the bottom of the retort. Perhaps 6 or 7 feet at the top of the retort would be bare of coal, which he did not think would occur with other forms of charging. The charging arrangements all through, he should say, looked perfect. Certainly their machine charging appeared clumsy, compared with charging in a setting of inclined retorts. It looked an ideal system for charging coal; but unless they could get exactly what they wanted on the floor of the retort, the ideal might not be altogether the best thing. It seemed to him that in charging inclined retorts a man needed to use his judgdment, and to be very skilled in watching the coal he was using, because, while in the South, the coal did not vary very much, they all knew that in the North a large quantity of the coal they dealt with was very variable. In the works he was connected with, they had such a number of coals to deal with that there must be a difference in charging. He certainly hoped that Mr. Herring would have the success he deserved; but he (Mr. Wilson) expected he would have difficulties, especially from what he saw of the charging in London, where it was not a new work. The system had been at work there for several years; and they were still making improvements, as they said, with a view to getting good charging. All the arrangements about the settings seemed to be very good; but they had great difficulty sometimes in getting out the charges. Perhaps Mr. Herring's style of retort (it certainly looked a practical thing) might help them very much; but in a good many of the retorts, where the carbon had begun to grow, there was considerable difficulty in getting out the coke—quite as much, he should say, as there was in drawing from an ordinary horizontal retort. This was not the case with all of them, but it was with quite a number. The difficulty might be got over, of course, by mixing the coal; but, as they all knew, they could not get in coal exactly as they wanted it. They had to use the coal as it came in day by day, and make the best of it. He thought they must all thank Mr. Herring very much for the splendid paper he had put before them. The difference, in his opinion, between inclined retort charging and charging horizontal retorts, with machinery or by hand, was much the same thing as a professional golfer trying to put his ball in on the "putting" green. If he had a fine green, and he was in good form, and his nerves in order, he could get his ball in from a considerable distance, and put it in pretty often; but if the green were lumpy, and he had

been out the night before, he would experience great difficulty. A thing like that took considerable skill. This seemed to him to be about the difference there was between charging inclined retorts and charging with machinery, because with machinery, or by hand, they put the coal exactly where they wanted it, with very little judgment, which was what they needed where large numbers of men were employed.

Mr. D. VASS (Airdrie) expressed a doubt as to the air-space between the benches. It seemed to him that the men had to face a very hot up-current from the retorts, as compared with what there was with horizontal retorts.

Mr. A. YUILL (Alloa) said he felt that the subject of inclined retorts was, perhaps, foreign to most of them, because the amount of work that was necessary to accommodate them properly meant that they must be in houses of a much larger size than most of them were accustomed to. All the same, he thought Mr. Herring had done the Association an honour in giving them the communication. In fact, it appeared to him to be more what they would expect from a text-book dealing with a particular subject, than a paper read before the Association. One matter struck him. Mr. Pooley had asked regarding the cost per mouthpiece. Perhaps Mr. Herring would give them an idea as to the fuel required for heating the retorts—the percentage of fuel necessary, either in relation to the amount of coke produced or the amount of coal carbonized. This would assist them in considering the subject.

Mr. J. WHIMSTER (Armagh) said he also would like to be allowed to ask Mr. Herring a question. In inclined retorts, the gas seemed always taken off at the lower end. It occurred to him it would be more natural to take it off at the upper end, because this would have the effect of keeping the retorts more free of carbon. What he wished to ask was why the gas was taken off from the lower end.

Mr. S. MILNE (Aberdeen) said the subject of inclined retorts was of very great interest to him, because in Aberdeen they had put down a small installation, by way of experiment. So far as the angle was concerned, they had one arch of 31½°, and another of 30°; and they had none of the difficulties mentioned in charging and discharging. The only trouble they had had was in the heating. They could not realize the results they would like. Their setting was intended to put through something like 7½ cwt. per charge. They tried this for some time, and found they were only getting about 8000 cubic feet per ton. They then reduced the charge to 7 cwt., and obtained better results. A few weeks ago they reduced the charge to 4¾ cwt., in six-hour charges; and this was very satisfactory. They had now reduced the charge to five hours; and they were having very fair heats. The whole difficulty appeared to him to be in the producer. The producer seemed to get choked up with clinker, which was very difficult to remove. He would like to ask Mr. Herring the dimensions of the producers he proposed to put in at Granton. In Aberdeen, their present arrangement was a setting of eight retorts, 9 feet long. He knew settings in England which gave remarkably good results; but they were settings of sixes. They were inclined to think that in their settings of nines they were trying to take too much out of the one producer. He would like Mr. Herring to state, briefly, the advantages of the inclined retort over the horizontal system with stoking machinery. Some speakers seemed to think there was greater first cost. From observation, he held it was practically the same. They could get a greater quantity of gas out of the same ground-space; but with the plant at their command, they could make out that the quantity carbonized in the one case was practically the same as in the other. Therefore he thought there was nothing to be said in favour of inclined over horizontal retorts, so far as ground space was concerned. Inclined retorts were certainly easier and simpler to work; and there was not the same possibility of a breakdown in the machinery. They would be pleased in Aberdeen to show their settings of inclined retorts to any of the members.

Mr. HERRING, in replying to the discussion, said that Mr. Pooley had raised a very important question as regarded constructional cost. They, besides being technical and practical men, were also commercial men; and unless they got some advantage to the balance-sheet, they usually did not favour any system brought before them. They must see some advantage before they could do much in the way of alteration. He mentioned in the paper that, under similar conditions of working, they were able to save 1s. 7·19d. per ton at Huddersfield. If anything, the cost of labour was rather greater at the end of the period than in 1894, when it was first started. This, of course, was a basis for anybody to start from—as to how much they could afford to spend; but then, at Brentford, they knew they had machinery prior to the introduction of inclined retorts, and there it was shown that they practically saved 18d. per ton also. This was their statement for a period of years; therefore no experimental errors could be assumed. He took the figures from the balance-sheet, so that there could be no errors; and so they might say that 18d. per ton was what they could save on the carbonizing wages. That was to say, a man could, under the new conditions, manipulate practically double the quantity of coal he could formerly. As to increased constructional cost, this, of course, depended a good deal on the man who erected the work. They knew that there were not two gasholders of the same capacity constructed for the same money; neither was it so with inclined retorts, oranything else. Some would put up a stronger bench than others; and one would maintain that a bench was sufficient which another would not have. The actual cost of the Huddersfield installation which was represented on the diagram was £105 per ton of coal. This, he thought, if compared with the structural cost of a retort-bench to be erected with horizontal machinery, was practically the same. But, in addition to that, there was the advantage that they got a much greater carbonizing area on the same space. The retort-house shown on the Huddersfield diagram was 87 or 89 feet wide, and contained two 15-feet retorts in the breadth. Therefore to compare this with horizontals represented a setting 30 feet long. He ventured to say that there were a great many retort-houses in which horizontal machinery was used which were not much narrower than this, and yet only contained 20-feet retorts. His experience was that an installation of this sort could be constructed, on the basis of a ton of carbonizing power, at the same outlay as the first cost of the construction of a horizontal bench for machinery. Mr. MacPherson raised a very important point—one that, in fact, induced him originally to put up the experimental station at the Edinburgh works. He was well acquainted with South Country coal. He had had a large experience of Yorkshire cannels and coal, where he had a great variety; and he knew what to anticipate when he came there, among another different class of coal. He therefore advised his Commissioners to allow him to put up two settings in the Edinburgh works. They put them up on the foundation of the old chimney—the only place available; and they had been working now for some eighteen months. It was a question whether the carbonizing of shale would long continue in Scotland; but, of course, in using it, they did so in separate settings of retorts now, and they must continue to do so, if they were to adopt the inclined retort system. They might possibly take the angle best suited to the shale. In the arrangement shown on the Edinburgh diagram, it would be seen that there was a division-plate in the coal-hoppers, so that they might have coking coal in one-half and shale in the other; the upper conveyor feeding at will either chamber. By a special arrangement in the measuring chambers, they could draw a charge from either of the divisions of the storage-hopper, and thus charge the retorts with either coking or non-coking coal. In this case, they could not depend upon the angle of the retort; and he favoured the splitting of the difference between the proper angle for the various classes, and depending for the charging upon the regulating arrangements of the charging appliances. Practically, in his experience this had more to do with the matter than the angle of retort. By means of the arrangements shown in the hoppers, they could charge the settings with either class of coal, or, in the case of settings of nines, the three middle retorts with coking coal and the outside retorts with shale; using the same angle for both, and governing this angle by the charging arrangements. He thought this remark answered Mr. Wilson's inquiry as to the various classes of coal; but, of course, they knew that things had not gone smoothly with everybody who had put up inclined retorts. It was so with himself when he first started. Mr. Wilson referred to London; but he thought it was generally admitted among engineers who had had any experience of the system, that in London they had not the best method by a long way. With regard to the varying class of coal coming forward, in his own case, in Huddersfield, the coal was carted to the works from the railway station; and the installation was sufficiently large to have a man in charge on the upper stage. This man could see the coal as it was being shot down to the breakers; and by that he could regulate the checks in the charging-shoots, in accordance with the coal he was receiving. He might be getting 50, 60, or 100 tons of any coal; and he would know that in a given time this would be worked away and into the measuring chambers. He could then adjust his checks. There would thus be one man on the shift who was responsible for the charging; and if the charging were not right, he would have to explain why. He quite agreed that, if it were left with the men, they would not get the charging looked after. Before they knew of it, the man on the shift would have gone off duty; and they could not get at him till next day, when a complaint would have lost a good deal of its effect. One of Mr. Pooley's inquiries was as to the size of the works. Of course, there was a limit to the size of works to which any mechanical appliance could be introduced. So far as inclined settings of retorts were concerned, if it were not for the fact of having to break and elevate the coal to the top of the house, there would be no limit. Inclined retorts were applicable, as a unit, to any works. If there was a works which already got their coal in at a high level, they could introduce inclined retorts; but if they had to keep an engine going to handle 5 or 6 tons of coal per day, it would not pay to introduce them. Mr. Wilson raised the question of machine stoking. He answered that by saying that he knew of two instances where a system of inclined retorts had been working for many years; and they had resulted in a saving of 18d. per ton in carbonizing wages. He had machinery in the Edinburgh works; but he had no machinery in the Leith works. The conditions of labour and wages were the same at both; and he found that there was really very little advantage with the machinery. The carbonizing wages in the Edinburgh works were very little lower than in the Leith works, where it was all hand work. It was from this basis he started, so far as the installation for Edinburgh was concerned. At Huddersfield, they went from purely hand labour to inclined retorts; in Edinburgh he was starting from hand labour and machinery. Mr. Vass asked a question as to the air-space; but this was not very important. There was a

wide air-space shown, in order to make matters as comfortable as possible. In Huddersfield, they started with a 17-feet stage, and then they went to 23 feet. Here they had 22 ft. 6 in. The Huddersfield house proved to be as comfortable as it was possible a retort-house could be; and he had no doubt that the one at Granton would be found to be so too. Mr. Yuill inquired as to the fuel account. At Huddersfield, it was 15 lbs. per 100 lbs. of coal. This was a matter which depended more on the construction of the regenerative setting than upon the particular retort to be used. The conditions were the same; it took no more heat for the one than for the other if it was properly applied. Mr. Whimster asked a question as to why the pipes were placed at the lower end instead of at the upper end of the retort, or probably at both. He thought it was an admitted fact that when there were two pipes in any retort, it did not necessarily follow that the two pipes would work at once. The gas would go the easier way. Therefore the disadvantage of having one pipe was not great. The reason the stand-pipes were placed at the lower end was that there was a great mass of ironwork on the upper, the charging-floor, level; and there was also the radiated heat, which had a great tendency to rise. It was found, where these settings were put up with the stand-pipes on the top side, that there was a greater difficulty in regard to stopped pipes. Another thing was that the length of the pipe was much shorter when on the upper side. There was a great advantage in a long ascension-pipe. It acted to a certain extent, of course, as a condenser; and invariably they were enabled to keep a slightly moist mouthpiece, on account of the condensation in the long pipe. They all knew that this was very desirable, and prevented to a great extent choked ascension-pipes. With the long ascension-pipes in the front, they would generally find that there was at the lip of the mouthpiece sufficient air and moisture to keep it clear, unless they had an extraordinary amount of heat in the fronts. As a matter of fact, it had been found to be more advantageous to have the pipes at the lower end Mr. Milne, who had already gone through that stage which many had gone through before him, was suffering from some of the earlier defects. The heating appeared to be his chief trouble, as it had been in most settings. On this point, he might say there was the proved fact that it was possible to make a sound regenerative furnace to heat any setting of retorts; and he did not think he would advise him to give up his settings of nines. He himself had never put up anything else but settings of nines. He was not always successful with them at first; but he had been since, both at Huddersfield and in Edinburgh. He also worked settings of nines 20 feet long, with full charges of four hours' duration; so that it could be done. There was no doubt that Mr. Milne's regenerative setting had become leaky or cracked; the secondary air not feeding the combustion of the gas in the settings. He was afraid he could not very accurately give the dimensions of the producer; it was about 4 feet deep from front to back, and at least 2 ft. 9 in. wide. The retorts were 22 by 15 in. by 20 ft. As regards the labour cost, of course, it was impossible to judge this where they had only got a small installation. Generally speaking, they could save half the cost as compared with their present system, the conditions of labour remaining the same.

The PRESIDENT said that Mr. Herring had laid before them a very practical paper indeed. It would be the more interesting as time went on—in fact, it would be to them a treatise on the newer method of carbonizing coal. There were unfortunately very few large works in Scotland which would be suitable for such installations. But as the output grew, they were obliged to change from the older to the newer methods; and this might become common in their works by-and-bye. He would ask them to give Mr. Herring a cordial vote of thanks for his courtesy and kindness in coming forward with his paper.

Mr. HERRING thanked the members for the manner in which they had received his paper. He was very pleased if they had been interested in it.

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## AUTOMATIC METERS: WITH A COMPARISON OF THE PRICE CHARGED FOR GAS CONSUMED BY SLOT AND ORDINARY CONSUMERS.

By T. LIGHBODY, of Renfrew.

The automatic or coin-in-the-slot arrangement is by no means a modern invention, as it can be traced back to a period anterior to the Christian era; and we are again forcibly reminded of the words of King Solomon, that there is nothing new under the sun. Originally, the slot arrangement was used for supplying liquid; but we have no definite information that it was exclusively used for supplying water, or if liquid of a more potent nature was also in demand at that period. However, we can rest assured that at that period it was not applied to supplying light; and we have to come down to the year 1887, when the first recorded application for the purpose was made by a Mr. John Stewart Wallace. This was followed by Mr. Brownhill, of Walsall, about a year later. The arrangement of the former was of as simple a nature as the latter was complicated; and in all the arrangements that have followed it has never been surpassed, and I am sure will never be equalled for intricate mechanism, or stupefying detail. A license for the manufacture of these meters was taken out, and a considerable number were put upon the market; but owing to their intricate nature they did not prove very successful. This patent is, however, still in force, but in a very much modified form; and the only regret that we can have is that the inventor did not live to see the important developments that have taken place with this class of meters.

An effort was made to meet the requirement of the small consumer by the introduction of a stop-meter about 1871 by Mr. Lacey, of the Chartered Gas Company, London. At that period, the principal objection of the small consumer was the deposit they were called upon to pay. This was followed by a well-known firm in this city (Edinburgh), who introduced to the notice of the Midland Association of Gas Managers at their meeting, held at Bath, in 1888, a stop-meter, and by Mr. Valon, of Ramsgate, a year later. These being prepayment meters, and having to depend on the visit of the gas official and his key, they have been successful in meeting the demands of the middle-class shilling; but they do not cater for the more humble penny of the democrat.

These meters were an incentive to other inventors; and within a few years we find almost all meter-makers in a position to supply automatic meters to suit the requirements of their customers, and to such a state of perfection have they attained, that they have been supplied to give from 3 up to 38 feet for 1d. I may say that the first was furnished to a gas company in Ireland to supply a billiard-room; and the latter I need only mention in connection with Widnes.

Treating the slot-meter and the position it has attained in the gas supply of the present day, we find that there are in use in

| | |
|---|---|
| England and Wales . . . . . | 604,600 meters. |
| Scotland . . . . . | 18,200 ,, |
| Ireland . . . . . | 5,400 ,, |
| A grand total of . . . . . | 628,200 meters. |

This shows an increase of something like 180,000 meters during the year. In England and Wales, the percentage of slot consumers to the total is over 20 per cent.; Scotland, 3½ per cent.; and Ireland, nearly 6 per cent. From the number of meters in use, they have a considerable effect on the returns of many corporations and gas companies. Estimating an average consumption of 10,000 cubic feet per consumer, gives a total of 6282 millions; and at 3s. per 1000 cubic feet, this means a revenue of £942,300.

That Scotland, which we like to see to the front in all things, should be so far behind as the above figures show, may be due to various causes. There may be a greater proportion of our householders ordinary consumers than in England or Ireland, thereby leaving us without the same field to work up; or it may be the cautious nature so characteristic of Scotland that the use of a slot-meter casts a reflection on their honesty. These and other reasons, which might be better left unconsidered, may be responsible for our small proportion of slot-meters.

Have we given our slot consumers the same consideration as our ordinary consumers? I am afraid not. Through the kindness of many of the members of the Association, I am enabled to place before you the average consumption and price charged to slot consumers and the price charged to ordinary consumers for twenty corporations and twenty gas companies—

| | Consumption per Slot Consumer. | Price per 1000 cubic feet to Slot Consumers. | Price per 1000 cubic feet to Ordinary Consumers. |
|---|---|---|---|
| Corporations. . . . | 6398 | .. 3/9·25d. | .. 3/2·40d. |
| Companies . . . . | 6207 | .. 4/0·05d. | .. 3/7·20d. |

These returns give an average extra charge of 6·85d. per 1000 cubic feet for the corporations, and 4·87d. for the companies. The difference in the price charged is from an equality to 1s. 3d. per 1000 cubic feet for the corporations, and to 11½d. for the companies. Five corporations and nine companies charge meter-hire to their ordinary consumers.

Why this difference in price should exist is a difficult question to deal with. We have all manner of opinions; but it is generally put down to extra capital and extra cost of collection. But to compare our slot with our ordinary consumers always appears to me a mistake; as in every town at least 25 per cent. of the gas is used by large consumers, and the capital cost for meters for this class of consumers is no comparison for the slot consumer. The same argument applies to cost of collection.

One illustration may be sufficient to make this clear. Take a consumer who, using a 250-light meter, costing £35 12s., consumes 1,250,000 cubic feet of gas per annum, is only incurring a capital expenditure of 0·341d. per 1000 cubic feet at 6 per cent. on the cost of his meter; while the small consumer who lives in a two-roomed house, and using a 2-light meter, at a cost of £1, who consumes 7000 cubic feet of gas per annum, is incurring a capital expenditure of 2d. per 1000 cubic feet, at 6 per cent. on the cost of his meter. The same argument applies to the cost of collection. In the first instance you have only one meter to survey and one account to render and collect quarterly, and in the second instance you have 178 each quarter.

It is, therefore, this class of small consumers that we must take into consideration in making a comparison between our slot and ordinary consumers, both as regards capital expenditure, cost of collection, and the price which should be charged. That this class of consumers swell the pages of the survey books of every corporation and gas company will be admitted; and I am also quite satisfied that if their average consumption be compared to the slot consumers, they will be found to be nearly equal to each other. But, for the purpose of comparison, take

the small consumer, who consumes 6500 cubic feet per annum, and has his meter supplied free, and take the average price as returned (less 2d. as capital charges), the net revenue derived from his consumption is 19s. 6d.; while the slot consumer who consumes the same quantity—viz., 6500 cubic feet at 3s. 9d.—yields a revenue of 24s. 4½d. This is an extra charge to the slot consumer of 22½ per cent. on the cost of the gas consumed, over the net price charged to the small ordinary consumer, or nearly 12½ per cent. on the cost of his meter. Now, place them on equal terms as to price (3s. 2d.), and again, taking the net revenue at 19s. 6d. from the ordinary, and 20s. 7d., this works out at 5½ per cent. extra to the slot consumer for his gas, or 2¾ per cent. on the cost of his meter. These comparisons are made on meters supplied to ordinary consumers free; but where meter-rents are charged, the price must be greater to the slot consumer to cover rent of meter than to the ordinary consumer. Therefore, so far as capital expenditure goes, if we can secure a consumer by fixing a slot-meter where we could not fix an ordinary one, we would be quite justified in doing so, and thereby increasing our gas consumption.

The extra cost of collection requires very little consideration, as I regard the interest on cash *versus* credit accounts and the saving in bad debts will go a long way in recouping this expenditure. In fixing the price, if we are to supply our small consumers with free meters, then equality of price is the only way we can treat this important branch of our industry; as I fail to see how we can go on charging an average of something like 22½ per cent. of an increase to our slot consumers and call it commercial dealing. As an illustration of how this business can be worked on an equal footing, I may be allowed to say that the company who charge their slot consumers 11½d. over their ordinary consumers, fix a cooker, or other appliance to suit their customer, and at the end of each financial year balance each consumer's account and charge 10 per cent. on the cost of the meter, cooker, &c., and return the balance. That this system pays is borne out by the fact that they have the remarkably large consumption of 18,900 cubic feet per annum for each installation.

I have prepared the following table, showing the return per cent. for each 1d. per 1000 cubic feet charged the slot consumer over the ordinary, at a consumption of 6500 cubic feet, with a 2-light slot-meter, costing £2, and the extra cost of a slot over a 2-light ordinary meter:—

| Extra charge per 1000 cubic feet over Ordinary Consumers. | Per cent. of total cost of Slot Meter. | Per cent. of extra cost of Slot over Ordinary Meter. |
|---|---|---|
| 1d. | 1½d. | 2½d. |
| 2 | 2¾ | 5½ |
| 3 | 4 | 8 |
| 4 | 5½ | 11 |
| 5 | 6¾ | 13½ |
| 6 | 8½ | 17 |
| 7 | 9¾ | 19½ |
| 8 | 10¾ | 21½ |
| 9 | 12½ | 24½ |
| 10 | 13½ | 27 |
| 11 | 14¾ | 29½ |
| 12 | 16 | 32 |

From the foregoing, we can see at a glance how we are treating our slot consumers compared with our ordinary consumers, to whom we fix meters free and allow three months' credit.

That the question of price is of some importance is borne out by the action of the London County Council, who have promoted a Bill for standardizing slot meters and fittings, and to regulate the charges made for their use. This Bill has been before a Committee of the House of Commons; but while they did not obtain the powers sought, the South Metropolitan Gas Company, in their Bill for 14-candle gas, had a clause for regulating the charge for slot meters which was agreed to. The Commercial Gas Company and the Gaslight and Coke Company have agreed to give effect to the decision of the Committee, either by a Bill or Provisional Order next session.

My personal experience with slot meters dates back two years. I then ascertained that within our area of supply there were 2100 inhabited houses and only 1600 consumers. With the view of increasing the number of the latter, I asked my Council to be allowed to introduce slot meters, and I received instructions to fix 24 meters, and give them three months' trial, and report. This being a satisfactory experiment, I had over 200 fixed within 18 months. These meters are set to give 22 feet for 1d., or 3s. 9d. per 1000 cubic feet; and in balancing the accounts at the end of the year I have no reason to complain of any discrepancy between the gas consumed and the money collected. So far as tampering is concerned, I have only had two such cases. One could be clearly traced to a spirit of mischief, and was done with a view of ascertaining the effect of inserting other than a penny into the meter. The result was no gas; but the meter being fitted in a club-house, it caused a flutter among the members. The other was due to an insecure padlock. This, in my opinion, is a very important detail which is very often overlooked.

In introducing these meters (to allow of their being easily changed, if any defect was found, or coins becoming jammed) I specified one union; and although I have had meters supplied by five different makers, they are all interchangeable. This, I may say, was carried out by the different makers without question or extra cost, and is a step in the direction of standardizing meter unions.

The great drawback to a very much greater number of these meters being in use is the extra price charged to slot consumers. Fortunately, or perhaps unfortunately, nearly all our slot consumers are in buildings recently erected. They are therefore living next door to small ordinary consumers; and they do not consider that they ought to be charged a higher rate than their neighbours.

I have kept a careful record of the cost of working this slot-meter system; and I find the total cost for collection, attending complaints, and removing meters to suit consumers to have been 1·028d. per 1000 cubic feet, while our ordinary cost of collection is 0·924d. per 1000, or 0·104d. extra. This, I may add, is almost made up by the absence of bad debts. In a fluctuating population such as we have, the comparison already given applies very strongly to Renfrew, where a few large public works consume large quantities of gas, and the population is almost entirely composed of working classes. I find the slot and the ordinary consumers are in point of consumption equal, and they are therefore being charged a very much higher rate than they ought to be; and I am quite sure, if my Commissioners were to give the slot consumers better terms, a very much greater quantity of gas would be consumed. I am very pleased to observe from the inquiries I have made that at least four corporations and three companies sell at equal rates. This is a step in the right direction. This means that I am not the sole advocate for equality; and I fail to see why we should wait till Parliament or the Board of Trade step in and fix a minimum. I consider that, from an outside observer's point of view, the manner in which the slot consumer is treated would not reflect on the gas profession as an ideal of sound commercial enterprise. If we are to make the most of the appliances which have been placed in our hands, let us sell the same to every consumer; and if by using a slot-meter we are enabled to sell 2000 cubic feet of gas where we previously sold only 1000, then by all means let us do so in the firm conviction that we are not only conferring a benefit on our corporation or company, but also to some home circle, by making life more pleasant and healthy, and at the same time removing the source of so many painful fatalities, which occur through the use of faulty oil-lamps.

*Discussion.*

The PRESIDENT said they were indebted to Mr. Lighbody for bringing the very important question he had before them. He thought they might call it a burning question. His own opinion was that the slot consumer was badly treated. There was, for instance, the extra charge of from, perhaps, 15 to 18 per cent. for the use of the meter. He did not see why this should be. Prepayment meters were a piece of their ordinary plant; and he thought they should be supplied in the ordinary way.

Mr. D. ROBERTSON (Dunoon) said that his experience of slot meters was not by any means extensive. He had only about a dozen in his district; and they happened to be fixed upon cookers simply, as a check upon servant girls, he understood, so that, if they consumed more gas than their mistresses gave them permission to do, it came back upon themselves. It was a question with him whether he should introduce slot meters or not. A great deal of his gas, as many of them were aware, was consumed by visitors, as was the case in all their coast towns; and there would be a difficulty in having so many strange people coming into the same house in a season. He thought it had been found, in other coast towns, that the meters went wrong very often. If anyone present was able to speak to this point, he should be personally obliged to him for information; but this was the difficulty which came to his mind: They might, perhaps, have half-a-dozen people in the same house, one after the other, and some of them might not know anything about a slot meter; and therefore, ten to one, the first time they interfered with it, they would put it wrong. He had a town in his mind where they had instituted a charge of 9d. extra, because people were so often putting meters out of order. Every time the meter was put wrong, they had to put it right again; and really he thought it was quite justifiable to charge for this. He questioned if corporations should be at the expense. With regard to Mr. Lighbody's contention that the rates should be equalized, or made more equal than at present, he thought he was quite right. It was altogether wrong that a consumer who paid cash should be made to pay more than his proportion of the charge for gas, simply for the reason that he paid cash. Suppose they charged a little more to cover the extra cost, 5d. per 1000 cubic feet should be quite a sufficient margin—possibly rather too much. There was no reason why they should be charged more than 5d. extra. When they considered the trouble and annoyance there was in the collecting of gas accounts (of which he had some experience), the slot meter must be a very great convenience—to the collector at any rate—because, as a rule, he found as much money in the box as the meter had passed, and this, in itself, was a great relief. He thought an effort should be made to introduce slot meters, and also to so regulate the price charged for gas consumed through them that there would not be the slightest cause for complaint.

Mr. J. W. CARMICHAEL (Barrhead) said that slot meters had been made to pay well. Some of them, he thought, had paid too well. Mr. Lighbody advocated uniformity in price; and there was a great deal to be said in favour of his contention. They could reduce bad debts by introducing slot meters, and they could keep on as consumers those who had been a trouble

to them; but it was a question whether it was just to ordinary consumers that they should charge an equal rate. He rather thought not. For instance, the price of the meter was about £1 more. If they took 5 per cent. on this extra price, it meant a shilling. He took it that the collection from slot meters cost per 1000 cubic feet double what it did by ordinary meters. On an average consumption of 6000 cubic feet, this would be another 3d., making 1s. 3d. Then if they allowed perhaps a further 3d. for repairs, this would make 1s. 6d. Divide this by six, and the result would be 3d. He held that 3d. or 4d. was quite sufficient to charge above the price paid by ordinary consumers; and he would only then say that the two systems were on an equality with one another.

Mr. H. Pooley (Dunfermline) said he had had a somewhat long experience with prepayment meters—having introduced them in 1893. They began with an additional charge of 9d., which had been gradually reduced. It was now 3d.; but he might say that he thought this was far too small an amount, and that it should be from 5d. to 9d., according to circumstances. They lent a stove free of hire, if the consumer cared to take one; and they pressed him to take it. The average consumption of gas with a stove was about 9900 cubic feet per annum; and, with the additional 5d. which he advocated, this gave something like 4s. 2d. of additional rate, over the ordinary meter return, which allowed 3s. as the rent of the stove, and 1s. 2d. as the rent of the meter. Of course, they charged no meter rents. They had other contingencies to take into account with prepayment meters, which should raise the charge for them. About 4 per cent. required to be expended upon them annually for repairs; and they occasionally had cases of tampering with money-boxes. He had only had four since 1893; but they were exceedingly annoying. In all the other instances he had been able to settle with the thief. He must congratulate Mr. Lighbody on his collection. Possibly Mr. Lighbody had a collector who was employed in other matters; but in his own case the cost of collection was about 2¼d. per 1000 cubic feet.

Mr. J. Whyte (Seaham Harbour) said he had about 180 of these meters in use. His experience of them was what the author of the paper seemed to have had. Theirs was a mining population; and this accounted for a good deal of the trouble and expense to which they had been put. He ventured to say that they had had to send no less than 250 meters back to the makers—some of them twice or three times—for repairs; and he knew that in their case even 9d. per 1000 cubic feet was not sufficient as an extra charge. When they counted the first cost of the meter, and the cost of keeping it in repair, it was not sufficient. All sorts of dodges had been tried. Pennies had been hammered on the edge, and slightly doubled up, so as to get the gas for nothing—and sometimes they did get it for nothing. His experience of slot meters was not so favourable as to warrant him, at all events, in making the charge equal to that for ordinary consumers.

Mr. J. Kincaid (Falkirk) said that in a town where they had about 1300 slot consumers, what troubled them most was bent pennies being put in, and stopping the mechanism. This meant the sending of a man to put the thing right. Another evil they found was that the valves did not close properly. Slot meters, of course, had not been very long in use; and up till now they had always sent them back, under the five years' limit. His opinion was that they should charge slot consumers a good deal more—at least 4d. or 5d.—than ordinary consumers, because it took that in extra expense in collecting the pennies, and extra cost of up-keep. At times, the registration did not agree with the money; but in Falkirk they set the meters to give a little less gas than they charged the consumers, and then, at the end of the quarter, they gave them back the difference. This pleased consumers very much. But in a town where it took them all their time to supply gas for the requirements of the place, he certainly preferred to furnish it to ordinary consumers.

Mr. A. Yuill (Alloa) said they had to thank Mr. Lighbody for bringing this matter up again. They had something of the same kind before them at their meeting in Ayr in 1897; and, so far, the opinions he had listened to were somewhat the same as were then expressed. At that meeting he also spoke on this question, and argued that a higher rate ought to be charged for gas consumed through prepayment meters than through ordinary meters. He had not changed his mind. The cost of fixing the two meters was practically the same; but they were, to begin with, brought face to face with the difference in the price of the meters. There might be a difference of 20s.; and suppose they had to meet interest and sinking fund, a difference of (say) 2s. on the cost of the meter was brought out. This 2s. ought to make a difference in the cost of the gas. Some had spoken about the difficulties they had with these automatic meters. He thought all who had experience of them would agree with Mr. Carmichael when he mentioned the difficulties caused by twisted pennies, and one thing or another. They ought to charge extra for this trouble. In his own case, they made a difference of 4d. per 1000 cubic feet. If they had an average consumption of 6000 cubic feet, this only came to 2s. a year, which left nothing to pay for the repair of the meter, if it went out of order. They had often to take these meters off, and send them away for repair. They were now beginning to be charged for the repair of the meters which had passed through the period of guarantee. Mr. Lighbody mentioned the relative difference in the consumption through prepayment meters, in England, Scotland, and Ireland. In the paper he read before the Association last year, he gave the total consumption in England, Scotland, and Ireland; and if he remembered aright, the total consumption in Scotland was 8·32 per cent. of the total in the United Kingdom. In Ireland, the percentage was 3·53. Mr. Lighbody gave the number of prepayment meters in use in England, Scotland, and Ireland. In point of comparison, England certainly had the advantage over Scotland and Ireland; but England was, as they were aware, differently situated from the other two countries, because in London there were whole streets in which there was not a single gas consumer. Now, he understood, some of the London Gas Companies had gone into the business of hiring-out the full gas-fittings of the houses, and charging an annual rental upon them. They had, to begin with, a much larger field to operate upon than there was in Scotland, because in Scotland, when a building was under construction, the whole gas-fittings were laid on in the house. So that in Scotland there must have been a much larger proportion of ordinary consumers than in England. This, in itself, might explain the difference between the 8·32 per cent. of the total consumption in Scotland, and the 2·89 per cent. that was consumed through automatic meters.

Mr. Lighbody, in reply to Mr. Robertson's question, said he had no doubt but that if prepayment meters stood idle four months in the year, as Mr. Robertson's ordinary meters did, they would go out of order; but he still objected to the 9d., which, in his opinion, was too high. Did Mr. Robertson charge anything for repairs?

Mr. Robertson: Not unless it is excessive.

Mr. Lighbody (resuming) said he had had bent pennies, but not to any great extent; and their population, as was well known, was composed almost entirely of shipbuilders and ironworkers. He had never had any foreign substances put into the meters, except those which he had mentioned. He thought Mr. Robertson would find that he would help his consumption by keeping the charge for gas as low as possible. He was very pleased that Mr. Carmichael thought the average charge was excessive, but still, he thought, he might take something off the 5d. With regard to Mr. Pooley's question, he was rather surprised that he should give a stove free and should charge the consumer by slot meter the extra price on the gas. It seemed to him to be a case of giving a stove as an inducement to consume the gas, and charging the rent of the stove on the gas which was consumed through the slot meter. Mr. Pooley also charged the cost of collection. He might say that he himself did not employ a collector who did nothing else. They collected six times in the year; but certainly the collector's whole time was not taken up collecting from the slot meters.

Mr. Pooley said that was what he meant. Mr. Lighbody employed a collector who did other work; but where there were 1000 or 1200 prepayment meters, they required to employ a man for collecting from them alone.

Mr. Lighbody (continuing) said, in reply to Mr. Whyte, that they supplied no fittings in new properties; they did not fix meters even. The proprietors did that. They never fixed a meter in any house, unless one had been there previously. Of course, the trouble from meters being tampered with depended on the class of consumer they had to deal with; and he thought that shipbuilders and ironworkers were quite equal to miners in the matter of mischief. Mr. Kincaid's chief troubles were bent pennies and the valves not closing properly. The latter was certainly a trouble; but there were meters in the market whose valves did close. The only drawback to this particular meter was that the people objected to the gas going out without warning. If a consumer burned his gas penny by penny, he might get more than the meter showed; and so it might be set 2 feet less. He thought they ought to use a meter in which the valves closed quickly; he objected entirely to the tailing out of the gas. Mr. Yuill, he considered, occupied a very favourable position. So far as charging the 4d. extra was concerned, he was among the lesser of those who charged consumers extra for gas. He said that where meters were charged for, the price must be extra; but what he objected to was the supplying of an ordinary consumer with a meter rent free, and charging the slot consumer such an advance as even 6d. He did not think this was treating the slot consumer fairly. Regarding the consumption of gas in Scotland through slot meters, in proportion to that in England, they all knew that they had an immense number of slot meters in London; and the average consumption per consumer was 18,000 cubic feet, as compared with 6000 cubic feet in Scotland.

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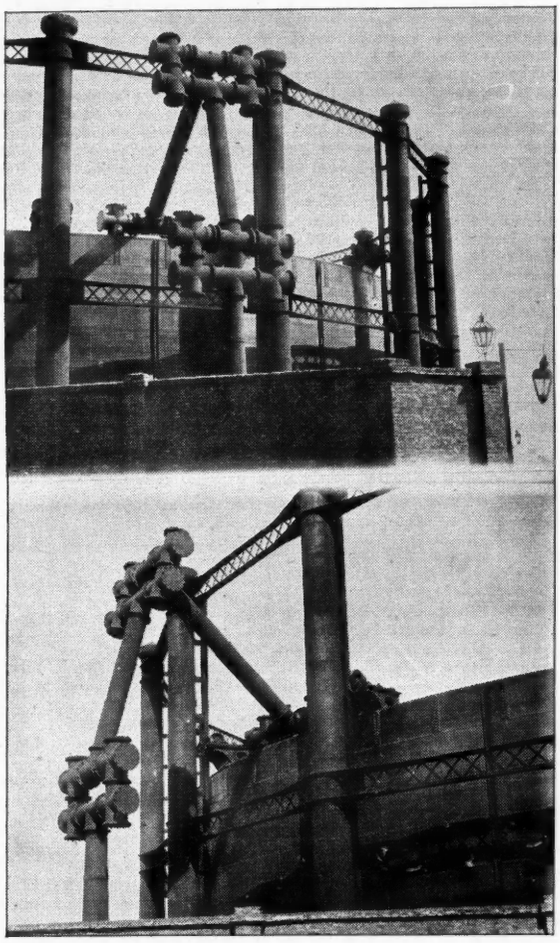
The destructive action on iron of free carbonic acid in water has recently been considered by Herr O. Kröhnke, whose report appeared in a German paper. The author analyzed the town's water of St. Johann, and found it to be pure and soft. The free carbonic acid amounted to 38 milligrammes per litre, and three months earlier it had been as high as 240 milligrammes. This water reduced the diameter of an iron pipe from 26 to 7 mm. in a short time, owing to the formation of a brown crust; while the pipe itself was corroded to a depth of from 1 to 3·5 mm. When tested in a closed vessel, the water was found to dissolve wrought iron very rapidly, with formation of ferrous bicarbonate. On exposure to the air, ferric hydrate was precipitated and carbonic acid regenerated.

## A FRENCH DESIGNED SOUTH AMERICAN GASHOLDER.

A correspondent has kindly sent two photographs which he thinks worth reproducing in the "JOURNAL." He has just received them from South America, and considers that they are typical of how things are done in some foreign gas-works in which British capitalists are interested. The arrangement of inlet and outlet pipes is one often depicted in French treatises on gas lighting for small types of holders; and the gasholder now illustrated is of French nationality. Our correspondent considers that there is nothing in the nature of the ground or



foundations that would make this method of filling and emptying the holder at all essential. As he remarks: "The castings alone are a curiosity—metal is cheap one would think. In hot weather the packed joints have a knack of jamming; and as the result, a nice little hole has been torn in the top of the holder more than once." He points out as an amusing anachronism the use of a triangular pivoted oil-lamp to light the walls of the gas-works, as shown by the upper photograph. Referring to the expensive construction necessitated by such an arrangement as this, our correspondent concludes: "Dividends need be large to provide for fads of this nature, or the price of gas very high—and it is. There must be ample scope for young engineers with brains and ability to make cheaper gas at a profit in South America."

**Improved Street Refuge Lighting in Westminster.**—Those who are interested in improved high-power gas lighting for street crossings, &c., may be recommended to inspect two new refuge lamps, each of fully 1000-candle power, recently erected by Messrs. W. Sugg and Co., in Whitehall (just opposite Downing Street), for the Westminster Vestry. The pressure-increasing plant is installed underneath the stairs of a subterranean lavatory, and in the circumstances the water used should not be charged to the cost of the lighting, as it can afterwards be employed for flushing. Taken at 9d. per 1000 gallons, however, the cost of the water is to that of the gas consumed, at the price of 3s. 5d. per 1000 cubic feet, as 7 to 17. Both lamps together cost in all 2s. 1d. per night, or 1s. 0½d. per night for 1000-candle power actual, full on all night. There are three mantles to each lantern; and the mantles last about six weeks in this extremely exposed situation, where the vibration due to the traffic is excessive. The lamps are now arranged to burn 30 cubic feet per hour up to mid-night, and 10 feet per hour after. It is the most brilliant light of the kind in London. The gas pressure is intensified automatically from about 2½ to 9½ inches.

## REGISTER OF PATENTS.

**Exhaust-Valves for Gas-Engines.**—Crossley, W. J., and Atkinson, J., of Manchester. No. 14,578; July 15, 1899.

The object of this invention is to reduce the load on the exhaust-valve of a gas-engine, so as to relieve the opening gear. The exhaust-valve of an "Otto" type motor—the patentees point out—frequently has to be opened against a pressure of upwards of 40 lbs. per square inch; and in a large engine requiring a large valve, this becomes a heavy load to be overcome by the opening gear. They therefore provide an equalizing piston on the head of the valve, which puts the valve more or less into equilibrium.

Figs. 1 and 2 are longitudinal sections through an exhaust-valve constructed according to two modifications of the invention.

Fig. 1.

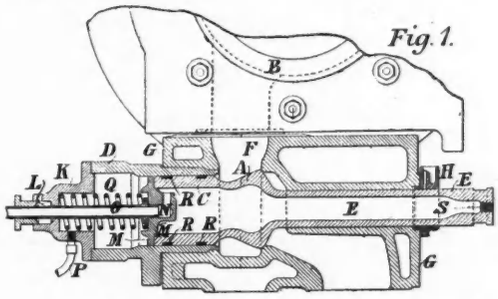
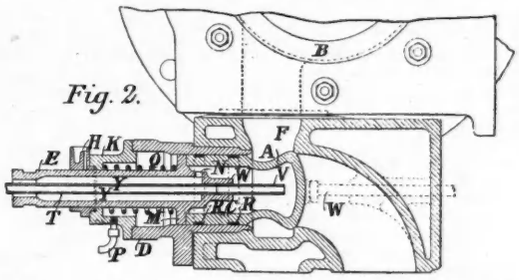



Fig. 2.




In fig. 1, A is the exhaust-valve, and F the exhaust-port leading from the cylinder B. The valve works horizontally, and has attached to it, at one side, the piston C working in the cylinder D; and at the other sides the hollow stem E, which projects through the valve-casing G, and the oil-gland H—the valve, piston, and stem being all hollow. The valve is slightly greater in diameter than the piston; and the cylinder is telescoped inside the casing (or otherwise removably attached to it), so that the withdrawal of the cylinder allows the valve to be removed. The cylinder is provided with a cover K and a stuffing-box L; and the piston has fixed to it a cap M, in which is bored an angular hole N, opening towards the top of the inside of the piston. Into the hole is screwed a pipe O, which passes through the stuffing-box. The piston is provided with rings R, rendering it nearly gas-tight; but what gas leaks through into the cylinder is led away by the pipe P to any suitable outlet. The spring Q for closing the valve is placed as shown in the cylinder. The cooling-water enters the hollow stem E at its end S, and escapes by the hole N and the pipe O; the position of the outlet preventing the accumulation of air or steam inside the piston and valve. The valve may be operated by means of its stem E, by any usual valve-lifting mechanism.

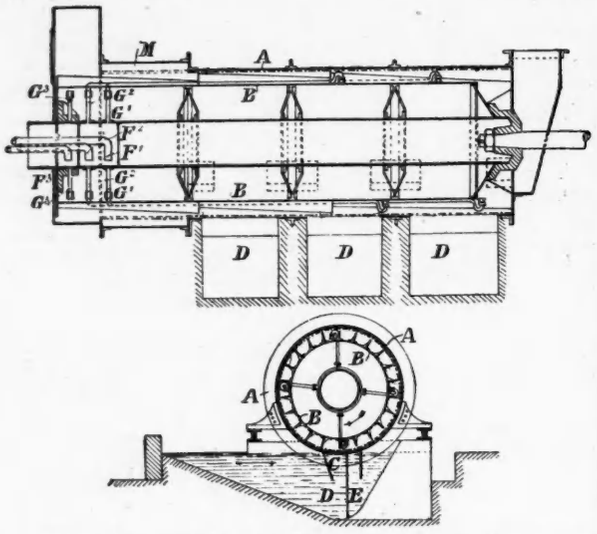
In the modification fig. 2, the valve-stem E is in one piece with, or attached to, the piston-cap M; and the stem is passed through the cylinder-cover K and the oil-gland H. The valve is closed at the end where the stem was attached in fig. 1; and the cooling-water enters by a pipe T passing through the hollow stem E, and screwed into the internal projecting boss U of the piston-cap M. Another pipe V, forming a continuation of the pipe T, and also screwed into the boss U, conveys the water to the valve A—the water returning by the hole N and the annular space Y in the stem E. The valve-spring Q is contained in the cylinder D, as in fig. 1; and a pipe P is provided as before to draw off the gases leaking past the piston C. The valve may be actuated either by means of the hollow stem E or by means of a pusher-rod W (shown in dotted lines) at the other end of the casing—the pusher-rod pressing against, but not being attached to, the valve.

**Gas-Washers.**—Theisen, E., of Baden-Baden. No. 16,735; Aug. 17, 1899.

In constructing his apparatus as referred to in patent No. 27,389 of 1898, the patentee says he has found that, arranging the rotating cylinder of a gas-washer horizontally, a more advantageous supply of the washing water can be effected than when it is placed vertically; the horizontal position has also great inherent advantages in large installations of the apparatus. At the same time, the horizontal form favours the pulverization and evaporation of the liquid in the whole of the space through which the gas passes; and security against the danger of explosion is attained.

By the present invention, the cylinder of a horizontal gas-washer is immersed to a small depth in water contained in a trough which extends along the whole length of the lower surface of the cylinder, or along a considerable part of it. At the immersed part, the cylinder is provided with openings so that the water may pass into the interior of the drum. The water or other liquid admitted into the apparatus is immediately whipped up by the rotating blades, and is carried round and thrown upon the inner surface of the drum, which is covered with wire or the like. Near the inlet opening, and separated from it by a partition, which does not extend to the bottom of the water-trough, there are exit-openings in

the drum, through which the washing water, after it has been scattered over the whole periphery of the drum, can pass away (after depositing the particles it carries with it), to flow under the partition to the inlet-openings.







A is the stationary cylinder, into which the gas to be purified enters at the right-hand end. In the fixed cylinder rotates the cylinder B, to the outer surface of which blades are attached. The inside surface of A is covered with wire gauze, "the purpose of which is to spread out and scatter the liquid so as to expose a large surface of it." This cylinder has openings which dip under the surface of water on one side of the partition E in the trough D, so that the surface of the water is just within the cylinder. The different troughs D may hold different liquids if necessary. The water which enters at C is whipped up by the blades on the rotating cylinder B, and is pulverized and evaporated. Through the tubes $F^1$ $F^2$ $F^3$ washing or absorbing liquids are supplied to the several chambers of the rotating cylinder. From these chambers spring pipes $G^1$ $G^2$ $G^3$, which end at various parts of the cylinder periphery in sprinklers, preferably closed by ball-valves, the balls of which are pressed on their seats by centrifugal force somewhat less than the pressure of the liquid flowing through the pipe. The liquid is ejected radially into the space between the cylinders A and B from these sprinklers, which rotate with the inner cylinder B. The flow of liquid through the sprinklers can be so arranged that it is smaller through some than others. In this way, the supply from the two first may be evaporated by the heat of the entering gas; while that from the third is sufficient to condense the vapour together with impurities. "By this means, the aqueous vapour or steam produced at the part of the apparatus where the gases to be purified or washed enter, in being caused by the centrifugal action of the blades to be brought into very intimate contact with even the finest particles of dust in the gases, will effectually envelop and lay hold of these, so that on being then subject to the action of the water spray in the other part of the apparatus, the condensation of such vapours will also cause such fine dust particles to be completely separated from the gases."

At the outlet for the gas, the cylinder A is enlarged to form a chamber M, across which the wire gauze extends. This constitutes a drying chamber—for the liquid collects behind the wire gauze, and the gas cannot take it up again.

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**Preparation of Carbide of Calcium ("Acetyloid").**—Worsnop, C. H., of Halifax. No. 16,763; Aug. 18, 1899.

This invention relates to a method of preparing calcium carbide so that it "can be transported from place to place without danger, and may even be left in the open air without danger." It consists in impregnating the carbide with a composition of wax, cocoa butter, and sugar, produced as follows: The wax (preferably paraffin wax), cocoa butter, and sugar in equal parts are mixed and heated—sufficiently to melt the mixture. At this point, a comparatively weak organic acid is added, such as tartaric acid, until the sugar becomes of the same consistency as the wax and the cocoa butter. The carbide is then immersed in the hot liquid mixture, and allowed to remain for a sufficient period of time to become thoroughly impregnated. The carbide may then be withdrawn and placed on trays in a cooling chamber, and when cold the new composition is complete. When used for the generation of gas (which is done by subjecting it to the action of water under pressure) the bye-product does not cling to the good material, as moist lime does to calcium carbide, but falls entirely away, leaving the unused clean material to continue its work of generation.

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**Manufacture of Carbide of Calcium.**—Rathenau, W., of Berlin. No. 6038; March 31, 1900.

This invention consists of a process for the refining of carbide of calcium and the simultaneous production of silicon iron.

In the manufacture of carbide of calcium by the process hitherto known, the patentee remarks, it has been proved that a pure product is only obtainable if the raw materials employed be free from objectionable admixtures—more particularly from combinations of magnesium and silicon; and since pure materials are not easily obtainable everywhere, it has become necessary to produce pure carbide of calcium from lime containing silicon, or from carbon (coke or the like) containing silicon. Experiments made in this direction have shown that certain metals—especially iron—have the property of taking up the whole of the silicon contained in the mixture of the raw materials when mixed therewith in proper proportions. It has also been found that, if the flux be allowed to deposit, the resulting silicon alloys will collect in a separate layer underneath the calcium carbide flux which is produced, and can be removed therefrom by being cut off. For a special anthracite containing silicon, a mixture of the following proportions has been found suitable: 56 parts of lime, 60 parts of anthracite (containing about 25 per cent. of silicic acid), and 28 parts of metallic iron. From this, there results a high percentage carbide of calcium, together with a compound of silicon and iron containing 20 to 25 per cent. of silicon, and "eminently suitable for industrial purposes."

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**Lighting Street-Lamps.**—Simmance, J. F., and Abady, J., of Westminster. No. 19,477; Sept. 28, 1899.

The claims for this invention include the combination with an incandescent gas-burner lamp of a fixed auxiliary pipe, terminating within the lamp, for the purpose of supplying an auxiliary jet of gas for lighting the gas from the main burner, a cock or valve for the main burner, and a cock or valve for the supply of gas to the auxiliary lighting jet, and operated directly or indirectly by the lighting torch, in such a manner that, after lighting the main burner, the auxiliary lighting jet is extinguished by a movement of the torch. Also the combination therewith of a fixed auxiliary pipe terminating within the lamp, for the purpose of supplying an auxiliary jet of gas for lighting the gas from the main burner, a treble-ported valve or cock controlling the supply of gas to the main burner, and to the auxiliary lighting jet—the treble-ported valve or cock being operated by the lighting torch in such a manner that gas is first supplied to the main burner and the auxiliary lighting jet; the torch then lighting the auxiliary jet, which, in its turn, lights the main burner, and the further movement of the torch extinguishes the auxiliary lighting jet. The arrangement referred to was sufficiently described and illustrated in the "JOURNAL" for May 1 last, p. 1127.

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## APPLICATIONS FOR LETTERS PATENT.

12,786.—BORCHARDT, H., "Means for lighting gas." July 16.
12,818.—COWAN, T. W., "Gas lamps or lanterns." July 16.
12,851.—BUCHAN, H. F., "Gas cooking-stoves." July 17.
12,914.—GREENWOOD, A. S., "Burners for hydrocarbon oils and gas." July 17.
12,920.—WILKINSON, J., "Manufacture of gas." July 18.
12,927.—BELLAMY, A. R., "Gas and similar internal combustion engines." July 18.
12,963.—CLARKSON, T., "Regulators for generators heated by liquid hydrocarbon, gas, and like burners." July 18.
12,975.—HOMER, E., "Internal combustion engines." July 18.
12,993.—SPROTT, E. W., "Acetylene generators." July 18.
12,994.—THUMAN, F., "Treating liquor obtained from the washing, scrubbing, or cooling appliances of carburetted water gas and other plant, so as to separate the tar from the water." July 18.
13,007.—ANDERSON, H., "Anti-vibrators for gas-pendants." July 19.
13,127.—CLARKSON, T., "Regulators for generators heated by liquid hydrocarbon, gas, and like burners." July 20.
13,139.—HOOK, H., "Street-lamp lighter and extinguisher." July 20.
13,147.—SUGG, W. T., "Supports for incandescent mantles." July 20.
13,162.—TRESENREUTER, G., "Bunsen burner." July 20.
13,191.—PENNINGTON, E. J., "Internal combustion engines." July 21.
13,194.—THOMPSON, W. P., "Production of acetylene gas." A communication from A. Giraud. July 21.
13,204-5.—GERDES, H., "Gas-generators." July 21.
13,234.—CUSSAC, H. & H., "Generating acetylene gas." July 23.
13 239.—FAJOLE, E., "Acetylene-gas generator." July 23.
13,259.—HILL, H., "Mantles for incandescent lighting." July 23.
13,281.—WISE, W. L., "Gas-brackets." A communication from R. Thayer. July 23.
13,289.—GUY, C., "Production of acetylene gas." July 23.
13,340.—WIEGAND, A. J., "Gas-cocks." July 24.
13,386.—SUTCLIFFE, H., "Generating, washing, cooling, and storing acetylene." July 25.
13,404.—BOULT, A. J., "Mixing gases." A communication from A. Molet. July 25.
13,408.—CHILD, J. F., and WHITE, R. J., "Gas-governors." July 25.
13,449.—SELLEY, R, and HOMER, F., "Valves for internal combustion engines." July 26.
13,451.—POTTER, W. G., "Incandescent gas-lamps." July 26.
13,528.—SIGURDSSON, O. V., "Automatically turning gas on and off at pre-determined times." July 27.
13,545.—HUDLER, J., "Incandescent gas-burners." July 27.
13,558.—BOULT, A. J., "Self-igniting incandescent burner." A communication from Chemisch-Technische Industrie-Gesellschaft, Limited. July 27.
13,563.—ACKERMANN, F., "Pressure-regulators for gas-burners." July 27.
13,568.—HONIGMANN, F., "Compressing gas or air." July 27.

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**The Proposed Conference on the Price of Gas.**—The Town Clerk of the City of London (Sir J. B. Monckton) has forwarded to the various Local Boards and Vestries of the Metropolis a copy of the resolution passed by the Court of Common Council on the 26th ult. in reference to a conference on the subject of the price of gas (see *ante*, p. 299). He adds that it is intended to hold the conference in October, on a date to be fixed (which he will notify in due course); and he asks that three representatives may be nominated to attend.

**The Blackburn Corporation and Carburetted Water Gas.**—At the last meeting of the Blackburn Corporation, the Gas Committee reported that they had considered and approved numerous suggestions of the Medical Officer of Health put forward as a precaution against mishaps arising from the use of carburetted water gas. With regard to the recommendations that small bedrooms should not have gas laid on, and that the practice in many mills of turning on all the gas-jets from one tap, and lighting them some minutes afterwards, should be stopped, the Committee reported that they had no powers in the matter.

# PARLIAMENTARY INTELLIGENCE.

## HOUSE OF COMMONS.

### Thursday, Aug. 2.

THE SUPPLY OF COAL.

Mr. D. A. THOMAS (Merthyr Tydvil) asked the First Lord of the Treasury whether, having regard to the growing scarcity and dearness of coal, and in view of the altered circumstances of the trade since the inquiry into our coal resources made by Royal Commission a generation ago, and the fact that experience had shown the conclusions of that Commission to be erroneous, he could now see his way to cause a fresh inquiry to be made in order to remove the uncertainty that prevailed as to the quantity of coal remaining unworked and available for naval, domestic, manufacturing, and commercial purposes.

Mr. BALFOUR said he did not think the scarcity and dearness of coal had any relation to the larger issue dealt with in the main part of the question. The subject of a revised survey of the coalfields was engaging the attention of a Committee now sitting in regard to the geological survey; and he understood that a report would be made to the Lord President of the Council. He thought it would be found useful to collect tabulated information with a view to determining whether or not it was necessary to hold further inquiry into this important matter.

### Friday, Aug. 3.

THE EXPORT OF COAL.

Sir HOWARD VINCENT asked the President of the Board of Trade if he could state to what countries the increased export of British coal had mainly gone, and, in particular, what Governments or countries had increased their purchases of coal suitable for naval use; and whether such export had increased the cost of coal for the Royal Navy or reduced its supply.

Mr. RITCHIE: The increase in the exports of coal, coke, and fuel from the United Kingdom during the first six months of this year over the exports in the first six months of 1899 was 1,073,000 tons. The increase, however, was not general among the various countries to which the coal was sent; there having been decreases in the exports to some countries amounting in the aggregate to 970,000 tons, and increases to others to the extent of 2,043,000 tons. The principal increases were: To Germany, 405,000 tons; to Holland, 451,000 tons; and to France, 810,000 tons. I am informed that the total exports of coal from Wales in the six months January to June, 1900, show a decrease of more than 400,000 tons, compared with the same period of 1899. The increase in the cost of fuel for the Royal Navy, therefore, cannot be attributed to increased export of the kind required.

**The Select Committee on Municipal Trading.**—The Joint Committee of the Houses of Lords and Commons appointed to consider and report as to the principles which should govern powers given by Bills and Provisional Orders to municipal and other local authorities for industrial enterprise within or without the area of their jurisdiction, have presented their report. The Committee express the opinion that, having been appointed at a comparatively late period in the session, it is not possible to bring their inquiry to a satisfactory conclusion during the present sittings of Parliament. They therefore recommend that they should be re-appointed next session.

# LEGAL INTELLIGENCE.

## JUDICIAL COMMITTEE OF THE PRIVY COUNCIL.

### Saturday, July 28.

(*Before Lord* HOBHOUSE, *Lord* MACNAGHTEN, *Lord* LINDLEY, *Sir* RICHARD COUCH, *and Sir* HENRY STRONG.)

**Montreal (Canada) Gas Company v. Vasey.**

This morning the Judicial Committee of the Privy Council, through Sir Henry Strong, gave judgment on the appeal of the Montreal Gas Company from the Court of Queen's Bench for Lower Canada (Province of Quebec), to which reference was made in the "JOURNAL" for the 17th ult. (p. 169).

The Hon. EDWARD BLAKE, Q.C., and Mr. BROSSEAU, Q.C. (both of the Canadian Bar), appeared for the appellants; Mr. LAWSON WALTON, Q.C., and Mr. R. C. SMITH, Q.C. (of the Canadian Bar), for the respondent.

Sir HENRY STRONG said that on Dec. 15, 1886, the appellants entered into a contract with the respondent for the sale to him of ammoniacal liquor produced by them in the manufacture of gas, by the terms of which the appellants agreed to deliver to the respondent, during a period of five years from May 1, 1887, all the ammoniacal liquor they should produce at their works; and the respondent agreed to pay 20s. for every ton of sulphate of ammonia he should manufacture from such liquor, so long as the net price in London should exceed £9 10s. per ton. The appellants also agreed to supply the respondent, during the same term, with all their spent oxide of iron, free of charge. Five days after the execution of the contract, the President of the Company wrote to the respondent the following letter:—

*Montreal, Dec.* 20, 1886.

Dear Sir,—Referring to the contract made with you on the 15th inst. for the sale of ammoniacal liquor, I may say that, if we are satisfied with you as a customer, we would favourably consider an application from you at the expiration of the term for a renewal of the same for another period.

(Signed) JESSE JOSEPH.

At the expiration of the contract of Dec. 15, the appellants refused the respondent's application for a renewal. The respondent thereupon brought his action against the appellants, seeking to recover damages for alleged breaches of the contract, and also for the refusal to renew the original contract, which the respondent alleged they were bound to do according to the terms of the letter of Dec. 20. The appellants filed an incidental demand claiming damages for breaches of the original agreement by the respondent. Mr. Justice Mathieu, before whom the case was heard, awarded damages to the respondent for the non-fulfilment in several particulars of the original agreement, and also for the non-renewal of the contract in accordance with the obligation to do so, which he held to be contained in the letter quoted; and in respect of this latter breach of contract, the Judge condemned the appellants in damages to the amount of $10,000, with interest from the date of the judgment. On appeal to the Court of Queen's Bench, this judgment was maintained, as regards the damages for breach of the contract held to be contained in the letter; but it was altered on the question of interest, by allowing interest, not only upon the $10,000, but also upon the other items of damages awarded to the respondent, from the date of the commencement of the action, instead of from the date of the judgment. The appeal to the Judicial Committee was from this judgment of the Court of Queen's Bench. The appellants insisted that the letter of Dec. 20, 1886, did not contain any contract or agreement susceptible of legal enforcement, and that the judgments of the Courts below, which treated it as imposing a legal obligation upon the appellants, were erroneous. This was the conclusion of the learned Chief Justice, who dissented from the Court of Queen's Bench. Their Lordships of the Judicial Committee were of opinion that the oral evidence admitted on the trial was improperly received. The letter must speak for itself; and if there was a contract to renew, its terms must be found in the writing. Their Lordships were unable to find in the promise made in the letter that the appellants would "favourably consider" an application to renew, anything legally binding the appellants. So far from this being so, the terms used implied that the appellants reserved to themselves the right to deliberate on the question of renewing the contract, if the respondent should apply to them to do so. The utmost that could be said was that the respondent, if he proved to be satisfactory as a customer, might, as the letter assured him, expect favourable consideration. It did not require demonstration to show that such an undertaking fell short of a contract. The appeal must therefore succeed, so far as it was sought to have the damages amounting to $10,000 for non-renewal, and the interest on those damages, disallowed. As regarded the alteration made by the Court of Queen's Bench in the original judgment, in the matter of interest on damages not in question on the appeal to the Judicial Committee, their Lordships were unable to see that the alteration was erroneous. The learned Chief Justice had considered that the first judgment must be taken to include interest on the damages awarded up to the date of the judgment. This, however, did not appear to have been done; and in the absence of any evidence that it was so comprised, their Lordships thought they must treat interest from the date of the action as not included in the damages. Then, as it appeared that the respondent was entitled to recover interest from the date the appellants were put "*en demeure*" by the service of process, the judgment of the Court of Queen's Bench in this respect must be considered not to have been successfully impeached. Their Lordships would, therefore, humbly advise Her Majesty to allow the appeal, by discharging so much of the judgment as awarded $10,000 for damages for not renewing the contract, and allowed interest thereon, and by so varying it as to award no costs to either party in the Court of Queen's Bench. There would be no costs of the present appeal.

## SUPREME COURT OF JUDICATURE—COURT OF APPEAL.

### Thursday, Aug. 2.

(*Before Lords Justices* A. L. SMITH *and* VAUGHAN WILLIAMS.

**The Costs in the Malvern Gas-Works Arbitration.**

This was an appeal by the Malvern Urban District Council from the order of Mr. Justice Bucknill, in Chambers, in reference to arbitration on the subject of the gas-works. On Nov. 23, 1897, the Council agreed to purchase the undertaking of the Gas Company—the price to be ascertained by arbitration. By the agreement entered into, the Council undertook to pay all costs, charges, and expenses of the Company preliminary and incidental to the negotiations for the sale and the preparation and execution of the agreement and the arbitration. In the event of the parties differing, the costs were to be taxed. The arbitration lasted two days, and the Company sent to the Council a bill for £2200 as the costs of the reference alone. By consent, the Council applied to Master Pollock to tax the costs; and he fixed them at £1147. Afterwards the Master stated that he had taxed the costs on a lower basis than between solicitor and client; whereupon the Company appealed to Mr. Justice Bucknill, who directed a review of the taxation on the ground that, on the true construction of clause 7 of the agreement, the costs should be as between solicitor and client. Hence the appeal of the Council, on behalf of whom it was contended that the learned Judge had wrongly construed the clause, which contemplated costs as between party and party, and that he had no jurisdiction to deal with the matter at all, inasmuch as the Master, in taxing the costs, acted as arbitrator, and not as a Master of the Court.

Dr. BLAKE ODGERS, Q.C., and Mr. SPOKES appeared for the appellants; Mr. JELF, Q.C., and Mr. G. H. FARRANT represented the respondents.

Lord Justice SMITH, in the course of his judgment, said he arrived at the conclusion that the Master had taxed the costs on the wrong ground—viz., as between party and party—which would only give the Company two-thirds of their costs of so much all round. The taxation should have been upon the basis of costs as between solicitor and client, in order that the Company should come out scathless. This was the view taken by Mr. Justice Bucknill, who was substantially right in his decision, because, as far as possible, it followed the lines indicated in the agreement of purchase. It had been argued that there was no power to review the decision of Master Pollock, as he was acting as arbitrator, and not as a Master of the Court. But the agreement brought in section 1 of the Arbitration Act of 1889, which provided that the decision on a submission of arbitration should have the same effect in all respects as if it were an order made in Court. Therefore this gave the Master, or an officer of the Court, the power to tax the costs in this case. The Master would now be ordered to review the taxation on the basis of

costs as between solicitor and client. The appeal would therefore be dismissed, with costs; but there would be no order in respect of costs as to the proceedings before Mr. Justice Bucknill, as he had made no definite order in the matter.

Lord Justice VAUGHAN WILLIAMS concurred.

### Embezzlement by a Gas Collector.

At the West Riding Assizes on Monday last week, Eli Crowther, a collector in the service of the Hebden Bridge and Mytholmroyd Gas Board, was indicted for making false entries in his books, and also for embezzling various sums amounting to £280, the moneys of the Board. It may be remembered that the accused was charged at Todmorden on the 5th ult. (see *ante*, p. 102). He pleaded guilty to both indictments, and was sentenced to six months' imprisonment with hard labour.

### Claim by an Artesian Well Engineer.

Mr. Justice Mathew and a Special Jury recently had before them, in the Queen's Bench Division of the High Court of Justice, an action brought by Mr. R. D. Batchelor, artesian well engineer, of Chatham, against the Rainham Water-Works Company. Plaintiff's claim was for £105 for services rendered to the Company when selecting a site for their new works at Rainham, and advising them generally as to water supply. The defence was that Mr. Batchelor only inspected the site in order to try to obtain the work of sinking the well; and the Company denied that they were liable for any amount. The Jury decided that Mr. Batchelor had been consulted by the Company as an engineer, and that he had not acted with the view of obtaining work. A verdict was given in his favour, and he was awarded 50 guineas.

### Automatic Meter Contracts.

At Willesden, on Thursday, the Gaslight and Coke Company summoned George Harding, of Palmerston Road, Wealdstone, for £1 1s. 6d. for gas supplied. Mr. Robert Humphreys, solicitor, who appeared for the Company, said the case arose under an automatic, or "penny-in-the-slot," meter contract. He called attention to a clause in the form of such contracts, to the effect that consumers when terminating tenancies must give at least five clear days' notice to the Company. The contract was proved; and three collectors were called, who deposed that the defendant was the tenant of 10, Shrewsbury Road, Harlesden, where he was supplied with gas through an automatic meter. On January 29 a collector found he could not gain admission to the house. On February 26 the premises were found to be open; and a workman allowed a collector to go in. No one was residing there. The padlock and money-box of the meter had been removed. There should have been £1 2s. in it, according to the index; and, in consequence of an alteration in the price of gas at that time, that would mean that £1 1s. 6d. was due. The defendant sent no notice of his intention to remove. A demand had been made; and he refused to pay. The idea of the clause in question, Counsel said, was to protect the Company from robberies from these meters in empty houses. The defendant, a traveller, could not attend the Court. Mr. Bird made an order for the payment of the amount and costs.

### The Use of Domestic Water for Trade Purposes.

At the Thornbury Police Court last Wednesday, a case of importance to the inhabitants of the town was brought before the Bench. The prosecutors were the West Gloucestershire Water Company; and the defendants, Mr. George Witts, baker, of High Street, Thornbury, and Frederick Holly, a man in his employ, who were summoned for using water from the Company's mains for other than domestic purposes. Mr. Metcalfe, in opening the case for the prosecution, stated that on Sept. 16, 1898, the Company entered into an agreement with the Thornbury Rural District Council, whereby the latter agreed to let certain stand-pipes and mains belonging to them, which were fixed in certain parts of the town, to the Company at the rent of 1s. for 30 years, the Company agreeing to supply for the same period, for the sum of £30 per annum, these stand-pipes with pure and wholesome water, for the use of the ratepayers for domestic purposes, and not for purposes of trade, watering gardens, and so forth. He argued that the agreement clearly showed that the water should not be used for trade purposes. Mr. S. F. Andrews, Secretary and General Manager to the Company, stated that on the 16th of July, when near one of the stand-pipes, he saw the defendant Holly filling a barrel on wheels. Witness asked him if he was aware that he must not use the water for baking. Holly replied that witness had better see his master. Thereupon witness followed Holly to the bakery, and made the same remark to the defendant Witts. The latter replied that he had used the water for baking purposes, and should continue to do so, and if summoned he should defend the case. After a long legal argument, the Bench came to the conclusion that the defendants were not persons having a supply of water from the Company, and therefore the prosecution failed; but they would give every facility to the Company to enable them to have a case stated. The summons was accordingly dismissed, with costs. The Company entered into recognizances to prosecute the appeal against the decision. Two other similar summonses were withdrawn.

**No Increase of Price at Birkenhead.**—At the meeting of the Birkenhead Town Council last Wednesday, Alderman Bloor, in moving the adoption of the minutes of the Gas and Water Committee, said he was glad to intimate that, notwithstanding the higher price of coal, there would be no increase in the price of gas. This was accounted for by the existence of a strong reserve fund, which the Committee had formed during recent years.

**The Fatal Fire at an Oil-Gas Works.**—The result of the inquiry into the circumstances attending the death of Charles Thomas, which was caused by the fire at the oil-gas works of the Great Central Railway, Sheffield, as recorded last week (p. 293) was a verdict to the effect that the deceased was accidentally killed by an explosion of gas through the breaking of a sweated joint in the machinery. They added as a rider that, in their opinion, it would be better to have a safety-valve attached to the "receiving" pipe, and to have the joints above the ground.

## MISCELLANEOUS NEWS.

### THE GASLIGHT AND COKE COMPANY.

The Half-Yearly Ordinary General Meeting of this Company was held last Friday, at the Offices, Horseferry Road, Westminster—Colonel W. T. MAKINS (the Governor) in the chair.

The SECRETARY (Mr. J. W. Field) having read the notice convening the meeting, the seal of the Company was affixed to the register of stockholders, and the report of the Directors (given in the "JOURNAL" last week) was taken as read.

The GOVERNOR: Ladies and Gentlemen,—In moving the adoption of the report, I hope not to trouble you so long as has been necessary at the last two meetings. Our accounts for the past year, considering all the circumstances, I think may be deemed to be fairly satisfactory. As regards our gross income, gas sales show an increase of 3·3 per cent., which, after allowing for the value of the 1d. taken off in January last from the price of gas, has yielded an addition of £20,316. Coke sales have brought in an addition of £100,582; and the average price of coke per ton during the last half year has been 15s. 7d., against 12s. 3d. in the June half of 1899. Tar has yielded nearly ¾d. per gallon more; and liquor and sulphate have brought in an addition of 3d. per ton of coal. So that altogether our residuals have yielded an improved revenue amounting to £154,740 for the half year. The high prices of these residuals are the result of the high prices of coal; so that before we have had to bear the full burden of an increased coal bill, we have been anticipating to some extent the relief afforded by the corresponding increase in the price of our residuals. Turning next to the debit side of the revenue account, there is an increase in the cost of coal and oil of £150,710, which is equal to an increase of 2⅝d. per 1000 cubic feet of gas. This arises to some extent from the failure or the inability on the part of some of our coal contractors to send in their contract quantities; and in order to maintain our stock, we had to go into the market and purchase coal where we could, at, of course, higher rates than the contract prices. I may state that now we have practically completed our purchases for the twelve months ensuing; and the price comes out at 69 per cent. above that of last year, and 88 per cent. above the price of the year 1898. The gross cost of coal, including the cost of carburetted water gas, per 1000 cubic feet for the next two years will be increased, as compared with the figures of the past twelve months, by 8d. per 1000 cubic feet. The further advances in the price of coke and other residuals we cannot take at more than 1d. per 1000 cubic feet; and this figure we arrive at from the results of the recent sales by tender of our Beckton coke. Working expenses during the half year, other than coal, have averaged 16·45d. per 1000 cubic feet, as compared with 16d. in June, 1899. This shows a gross profit of £628,018, or 13·4d. per 1000 cubic feet, as compared with 14·28d. per 1000 cubic feet in the corresponding half year. Preference and other charges will absorb £194,749; and this leaves for the dividend on the ordinary stock £433,269. Our statutory rate, with gas at the present price, is £4 8s. per cent. This corresponds to the present price of 3s. 5d. per 1000 cubic feet, and will take £329,848; so that there will be a balance which we shall be able to carry forward and add to the sum brought forward from 1899, of £103,421. This makes the total undivided balance £296,755, which, of course, under the present circumstances, will be a very useful supplement to our working capital. There is one item in the working expenses which calls for special notice. I refer to the rates and taxes. This shows an increase, as compared with June, 1899, of upwards of £7000; and there is a prospect of a still further increase in this item. The rateable value of the Company's undertaking is at present £730,600. It has quite recently, during the present revaluation, been revalued at £791,800, which would mean that in future the item of rates will be further increased by £20,000 per annum. Of course, the Directors will, if necessary, appeal against this rating at Quarter Sessions, although such proceedings are very costly. But I think it is as well for me to state that, should the revaluation be confirmed, the consequence must be that the consumers of gas in the Company's district will have to bear the burden of a further addition to the price of gas; and it cannot be too often repeated that, in accordance with the terms of their deed of partnership—that is, the Act of 1876—whatever additional charge the Company has put upon it, five-sixths of the amount must be borne by the consumers, and one-sixth by the shareholders, and *vice versâ* that out of any savings or advantages which come to the Company five-sixths go to the consumers and one-sixth to the shareholders. So that the chief sufferer by this extraordinary increase in the valuation of our property for rating purposes will be the consumer of gas. We shall do everything we can to protect him, along with ourselves; but having done that, we can do no more. Our expenditure on capital account has been limited to the provision of the necessary plant to meet the increase in our business; and I need hardly say that we are exercising, and shall continue to exercise, the strictest economy in regard to capital expenditure. Out of the £76,894, £62,187 is for the cost of mains, meters, and stoves. The remaining £14,706 is made up of purifiers £5500, oil gas £8600, and sundries £606. Before I pass from the accounts, I would like to draw the attention of the shareholders to a slight alteration we have made, with the sanction of the Government Auditor, in dealing with the cost of the fittings supplied to automatic-meter consumers. Hitherto these have been charged to a suspense account, which was liquidated by means of half-yearly instalments. On the present occasion the item—which amounts to £26,574—has been charged direct to revenue account; and at the same time, the old suspense account has been reduced by £35,413. I now have to deal with the question of the increase in the price of gas, which came into operation at the close of last quarter. The necessity for the increase, in view of the higher price of coal, must be evident even to that oft-quoted individual, "The Man in the Street;" and I am glad to be able to say that, though we have some 360,000 consumers or thereabouts whom we supply with gas, we have received protests against the rise from a quite insignificant number of those consumers, and the complaints have been confined to some few people who appear to expect the price of the quartern

loaf to remain the same whether wheat stands at 28s. or 40s. a quarter. To meet an increase in the net cost which is equal to 7d. per 1000 cubic feet of gas, after we take off the 1d. we have no funds available, except the gas rental and the dividend account. Therefore, as provided by the sliding-scale, on the one hand we raise the price of gas, and at the same time reduce the shareholders' dividend. This is all provided for in the Act of 1876. "Yes," say the London County Council, "that is all very well, but what are the relative proportions?" Does not the consumer have to bear five-sixths of the charge, and the shareholders only one-sixth? And then, without any consideration of the past working of the system, they assert that the sliding-scale does not work satisfactorily to the consumers. In fact, they condemn the system because it is not wholly a one-sided system working in favour of the consumer. Now what are the facts? Since the introduction of the initial price and the sliding-scale in 1876, the surplus profits of the Company over and above 10 per cent., amounting to £17,000,000 (I am giving only round numbers; but that is sufficiently near), have been apportioned in this way: In reductions of the price of gas and meter-rents, £14,000,000; and in augmenting the shareholders' dividends, £3,000,000. Surely, I think, this must be admitted to be a complete answer to the allegations of the critics of the system; and yet, with the full knowledge of these figures, which are all in evidence, Dr. Collins, an ex-Chairman of the London County Council, stated, in a recent debate at the Council, that the sliding-scale is now found not to work so well in the interests of the consumers as it does in the interests of the shareholders. Again, he says that the consumers' share of the burden has increased, although he must have known (for he had the figures of the Comptroller in his hands at the time, in the case of this Company) that for £87,000 gained by the consumer by a reduction in the price of gas, the shareholders' proportion was only £14,806; and he must have known quite well—or he might have known, at any rate, because I am about to quote a paper which was given in evidence—that the reductions in price have been the rule and not the exception. A statement was prepared by Sir Courtenay Boyle, and laid before the 1899 Committee, which showed that from 1876 down to the present time there have been fourteen alterations in price. Ten of them have been reductions, and four of them have been increases. The reductions amount, in the aggregate, to 1s. 7¾d.; the increases to 1s. 3d. Another member of the Council, in the same debate, charged the Company with obtaining money by false pretences, and with obtaining an addition to their net profits of £500,000 because coals had gone up; and he also charged us with hoodwinking the public. Now, I ask—and this is the only opportunity I have of asking—on what evidence are such statements based? And if they are not evidence, I do not think this Company or any other company should be subjected to such slanderous attacks. As to the prospects of the continuance of the present price of gas, I cannot say more than this—that those who review the history of the Company, and know its history, know perfectly well that a reduction in price will be made at the very earliest moment. But everything depends upon the price of coal; and I am sorry to say that at present there is no sign at all of any reduction in coal. On the contrary, the prices at the present moment are higher than those at which we made our contracts in May last. I hope there may be somebody present who can give us a little light on this dark question, or give us a few gleams of hope. As far as we can see at the present time, the coal market is stiffer than it has been; and there is no prospect of relief. Paragraph 8 of the report tells you of the loss of our Bill for additional capital powers. Now our justification for bringing in the Bill in the form which we presented it to the House, was, first, that it was the same Bill which had been approved by the House of Commons the year before; and, secondly, because we were convinced—and we see no reason whatever to alter our opinion—that our scheme for raising the additional capital was the cheapest and most advantageous for the consumers of gas. A 3 per cent. capital—we proposed to raise our money by a 3 per cent. debenture stock—for a gas company would have been the cheapest capital on record. But public confidence has been so shaken by recent events, that I fear any such cheap form of capital must be lost to the consumers, if not for ever, at any rate for some time to come. It has been suggested, if not actually stated, that the Directors, in bringing in the Bill this year in the same form as last—that is, on the basis of debenture stock, instead of on the basis of share capital at the standard price—intentionally ignored the recommendation of the 1899 Committee. We are not so stupid and so ignorant as not to know that Parliament in such affairs is omnipotent; and nothing could be further from our minds than any idea of flouting, or treating disrespectfully, the recommendation of any Committee of the House of Commons. The future policy of the Company as regards further capital powers will, of course, engage our serious consideration; and the result of our deliberations will be made known to you in due time—probably at the next half-yearly meeting. Still referring to legislative matters, I may inform you—and perhaps many know—that the London County Council have also been unsuccessful in their gas legislative schemes this session; for they failed to carry the provisions of their Bill for the legalizing of the portable photometer. The evidence placed before the Committee in support of these proposals was certainly of a most extraordinary character; but it was not accepted by the Committee. It was, I am glad to say, noticeable that for once this Company did not suffer from the wholesale abuse which usually falls to its share when its affairs have been discussed by the London County Council. Not a single charge was brought against the Company. We were left severely alone, except so far as the costs are concerned, with which we were saddled. At least, the concern is saddled to the extent of some £3000, of which, of course, as I said before, £2500 is the increase in the working expenses, and comes out of the price of gas, while only £500 comes out of your pocket—that is, out of the dividend fund. Now this amount of costs (about £3000) is, of course, exclusive of the costs of the other Metropolitan Gas Companies who joined us in opposition to the Council's Bill, and is also exclusive of the costs of the Bill in question incurred by the London County Council themselves in the promotion of the Bill, which must be borne by the rates; so that those of you who are ratepayers will have to find a little more money on that account. The ratepayers and the consumers alike will be taxed to a serious extent in consequence of this, I may say, almost wanton attempt to interfere with existing testing legislation, under which we have gone on satisfactorily for so long; for out of 21,000 tests that were made, we were only fined twice. Therefore the system cannot be said to have broken down, or not to be a proper system for the protection of the public. I may say also, in regard to this matter, that, if the portable photometer scheme had been accepted by Parliament, the Metropolitan gas consumers would have been taxed to at least 1d., if not 2d. per 1000 cubic feet, merely for the purpose of increasing the already very high illuminating power of the gas. The only other matter dealt with in the same Bill—that is, the London County Council Bill—was the charge made for the use of automatic meter fittings. This question was the subject of a conference between the Companies and the Council, with the result that the clauses were redrafted in a manner unobjectionable to the Companies, and will probably afford some slight additional protection to the small consumers of gas. I must refer again to that remarkable debate at Spring Gardens. A noble Lord, a very prominent member of the Council, appears to be dissatisfied with the provisions of the Bill—I mean the provisions with regard to automatic meters—because he deems it quite wrong to make any charge upon poor people for the extra accommodation which the Gas Companies afford to the working classes, and which is so much appreciated by them. If his remarks mean anything at all, they must mean that this popular system of gas supply should be abolished, or that the ordinary consumer of gas should be taxed to the extent of about 1d. per 1000 cubic feet to provide free fittings for the working man consumer. This appears, to my old-fashioned ideas, to be absolute Socialism, and nothing else. I think I have only one more matter to deal with, and that is the repulse which this Company and the South Metropolitan Company have experienced in the House of Lords in endeavouring to carry into effect one of the most popular recommendations of the 1899 Committee—I refer to the suggested sale to the South Metropolitan Company of our southern district and works. This has been the subject of anxious and prolonged discussion by our Court. We had two interests to protect—those of the consumers in the North, which would be damaged by the acceptance of too small a price for this section of our undertaking, and those of the shareholders. But as we were at the same time desirous of showing, as far as we could, that this recommendation of the Inquiry Committee should be carried into effect, we, with the Directors of the South Metropolitan Gas Company, provisionally agreed upon a figure—a figure which we all here looked upon as inadequate as consideration money for the sale. But, as I say, in order not to flout, but to meet, the recommendation of the 1899 Committee, we submitted to a small sacrifice. Of course, when I said "we here" considered it too small a figure, I have no doubt, on the other side of the water, they thought it quite an adequate figure—at any rate, it was the only figure we could get out of them. Then, to the surprise of everybody, the Local Authorities brought all their forces to bear against the proposed sale. Their contention was that, although we were to part with the district, we were to remain saddled with the obligation as regards the price to be charged for gas supplied to public lamps in the northern district, which we undertook in 1883, in consideration of obtaining the London Company's district. Of course, this was a suggestion we could not, in the interests of our private consumers, for a moment entertain; and apparently it was also one which the House of Lords did not consider reasonable, for they refused to confirm the Bill. So that the blame, if there is any blame, for the failure to carry out this recommendation, must rest with the Public Authorities, and not with the Metropolitan Companies. In conclusion, I can only offer you one or two observations on the policy of the Local Authorities, and of a small section of the public, with regard to this Company. I think we who administer this Company have a right to complain of the somewhat harsh and unfair treatment which is meted out to us by our critics, both in Spring Gardens and elsewhere. It cannot be considered fair treatment to make general charges of maladministration without submitting in support of them some evidence—and evidence which can be examined into—and without specifying what are the acts that are complained of, when they were committed, and who did them. If we had this information, we should be able, perhaps, to make a defence; but it is impossible to make a defence to vague charges which are not based upon specific acts or a specific policy. The charges always take the same form, because other Companies, or another Company, acting under similar legislation, can make and sell gas at a lower price than the Gaslight and Coke Company, therefore the management of this Company must be bad. No account whatever is taken of the differing circumstances, which now, as always, render the two cases absolutely incomparable. I refer to one circumstance, a prominent one, which specially prevents any fair comparison being made between the two Companies—that is, the relatively large increase in business which the Southern Company receives. Their increase for the past half year has been at the rate of 12¼ per cent. I think that ours has been at the rate of about 3¼ per cent., and the accounts for the two Companies show that for the whole period—and we can compare that—since the amalgamation in 1883, the increase secured by the South Metropolitan Company in business amounts to 136 per cent., whereas ours only amounts to 46 per cent. It must be obvious to everybody that an expanding business can be carried on at a cheaper rate than one which is not so expanding. Of course, the reason is also pretty obvious. The competition of the electric light does not affect the Southern Company to anything like the same extent that it affects ourselves. Criticisms are plentiful; but no one yet has ever had the hardihood, even in Parliament or elsewhere, to lay down or prescribe any course of action which could by any possibility assimilate the prices charged by the two Metropolitan Companies, short of total confiscation of the dividend of this Company. I use the words "total confiscation" advisedly, because the existing difference in prices between the two Companies to-day is 7¾d., which represents in this Company's district £717,000. The dividend which I suppose you will declare to-day on the ordinary stock of the Company at £4 8s., represents £668,000. So that, after you have confiscated the whole of the dividend, you would still be £57,000 short of assimilating the prices of the two Companies. Now I do not know what sort of words to use in describing a policy of that kind. I think it had better be left undescribed. The Court of this Company will, therefore, as they are in duty bound, carry on their business with a view to the common interests of the consumers and the shareholders. It is apparently assumed by the London County Council that the interests of the Company and the interests of the shareholders are antagonistic. I have shown over and over again in this room that, under the sliding-scale and auction clauses, this cannot by any possibility be the case. Therefore,

we have no objection whatever to raise to any amount of inquiry and any number of conferences, such as those which are about to be held. Any investigation of our position must show this—that either the system of the sliding-scale and auction clauses which was so highly eulogized by Sir James Rankin's Committee must be maintained, or that some other system working as equitably must be substituted. There is only one other alternative, and that is that the supply of gas should be taken over by the Municipal Authorities; and as to that policy, I have no doubt you are aware there is considerable difference of opinion. I can only say that my colleagues and I have never since we sat at this Court deviated one hair's breadth from the terms of the bargain which was sanctioned in 1876. Taking one year with another, we have done quite as well as our neighbours in the purchase of our materials and the sale of our residuals, and in our efforts to extend the Company's business; but neither we nor any other body of gentlemen could possibly alter the different conditions and circumstances under which we carry on business as compared with other Companies. When we next apply to Parliament for capital powers, we shall lay before the House the whole history and full facts with regard to this Company's working under the legislative bargain of 1876. Notwithstanding the rebuffs we have received during the past two sessions, we still have every confidence that Parliament, when fully informed, will not fail to grant the fullest justice to the shareholders of this Company, who have *bonâ fide* subscribed their capital on the faith of the parliamentary bargain, and will grant us the capital powers necessary to enable the Company to fulfil their obligations to the consumers of gas in their district. I beg to move: "That this meeting do agree with, and confirm, the report of the Directors and the Auditor's report and statement of accounts of the Company."

Mr. Howard C. Ward (Deputy-Governor) seconded the motion.

Mr. Frame asked whether the Company could not take action in respect of the breach of contract in the supply of coal by their contractors.

The Governor said the coal contract was drawn up in the usual terms, but there was a proviso which protected the coalowners in the case of strikes.

Mr. Frame said that as the increased price was foreseen, and the Company had so large a sum in hand, he could not understand why they did not enter into the contract before.

The Governor replied that the contracts were made up from year to year.

Mr. Frame supposed they had a right to make further contracts before the expiration of the year.

The Governor replied that it was never the practice to make the contracts much before.

Mr. Frame said that for six months it had been known that coal was increasing in price, and he should like to know whether there was any restriction against the Company going into the market.

The Governor said there was not; but if they had gone into the market in the winter, they would have paid just the same price.

Mr. Frame thought not. He happened to be connected with coal companies in South Wales.

The Governor remarked that they did not get any coal from Wales.

Mr. Frame asked whether anyone connected with the Company was entitled to a free supply of gas.

The Governor said the practice was to allow their officers a certain quantity of gas free of charge; but this did not apply to the Directors.

A Shareholder said he thought it would be as well to return to the old practice of charging for meters, as the Company were now giving away a large sum, and getting no thanks for doing so.

The Governor said this matter was debated at the time the charge was removed, and approved by the shareholders. In the City of London, the consumers always had free meters, but in other places they had to pay; and, as this gave rise to some complaint, the Board suggested, and the shareholders approved of the policy of free meters.

Mr. Monk thought the most important part of the Governor's remarks in moving the adoption of the report was in regard to the future of the Company. He should have been glad if the Governor had been able to inform them that the Directors had good hopes of obtaining in the next session the capital which it was evidently necessary that a concern of this nature ought to possess. He should be glad to hear from the Governor that he had not lost all hope of coming to an agreement with the South Metropolitan Company with regard to the supply of gas south of the Thames. He should also like to know whether it was the intention of the Company to apply to Parliament next session for the powers which they were not able to obtain this year.

Mr. C. E. Jones said he felt sure the shareholders must be thoroughly satisfied with the statement of the Governor. The increase in the supply of gas was highly satisfactory, and showed that the progressive development of the Company had not been arrested by rival illuminants. He did not profess to be a prophet, but some years ago he warned the shareholders that coal would never be so cheap as it had been. The gas industry of the country would be saddled with an increased cost in the price of coal of over 5½ millions sterling, and there were other advances in the materials used in the Company's business which would considerably augment this. The coal trouble was not one of to-day. They must go back for the origin of it to the last strike, when there was a struggle made by the men to obtain the supremacy of the coal market. The colliery proprietors fought the battle, and the wives of the colliers enlisted public sympathy. The masters could fight the men, but they could not fight the public; and therefore they came to terms. This was another instance of the folly of the public rushing into questions which they did not understand. If men and masters fell out, the best thing was to let them fall in again, and for the public to remain spectators of the fight. Free labour in collieries was unknown; and yet this was called a free country. By restricting the output of coal, the collier was the master of the situation. Was he likely to restrict the output? He (Mr. Jones) thought that he was, because if he brought more coal to bank than was actually required at the time, it was put into stock, when down came the price and the rate of wages. It was time the Legislature interfered in this matter, and put a duty upon the export of coal. Some 40 million tons had been exported from this country, the large proportion of which went to foreign lands; but if it had been sold in the English market, there would have been a considerable reduction in price. He thought there was a precedent for Parliament interfering, as it regulated the price of gas and water, besides allowing oil to come into the country free. If it was fair to tax the profits of the shareholders in gas companies, it was equally justifiable for Parliament to interfere in the matter of coal. He suggested that the Company should purchase a poorer quality of coal from other countries, and enrich.

Mr. G. Livesey: What about the price of oil?

Mr. Jones said there were other processes of enrichment besides oil.

Mr. Livesey said he should be glad to know what they were.

Mr. Jones thought it was not wise to go too much into details at that meeting. If they could get Australian coal, he thought they would be justified in making some experiments. The deterioration in the quality of coke was more apparent than real; and he had sufficient confidence in the scientific staff of the Company to know that, if they had a free hand, they would give a good account of this question. For his own part, he never believed in the sliding-scale. It was not a panacea for discontent, and never would be. The old process of sticking to the statutory dividend of 10 per cent. was the true policy for the gas industry to pursue. He much regretted that Parliament had not seen fit to allow the Company to raise cheap capital. Geographically, a portion of the district of the Gaslight and Coke Company belonged to the South Metropolitan Company, who had been hungering and thirsting after "Naboth's vineyard" for many years; and it was to be regretted that after the two Companies had agreed upon the price, Parliament was told that it was a matter of indifference whether they bought it or not. In conclusion, he congratulated the Directors upon the satisfactory report presented that day.

The Governor, in reply to a shareholder, said the amount of unraised capital was £450,000.

Mr. George Livesey said he thought Mr. Jones was a Job's comforter, especially in his remarks about coal, for what he had said was distinctly playing into the hands of coalowners, who were now making enormous profits. He estimated that the excess profits were not less than 5s. a ton; and in case of gas coal, 8s. a ton. But taking it at the lower figure of 5s. a ton, on 240 million tons that amounted to £60,000,000, or, in other words, the total cost of the Transvaal war. Mr. Jones told them that coal would never go down in price again.

Mr. Jones said his complaint was that it would not go down to its old price.

Mr. Livesey said he would accept that correction. He was old enough to remember the days of 1873, when it was said that coal would never go back to its old price. In 1871, the South Metropolitan Company made a contract at 6s. per ton, free on board in the Tyne. In 1873 they paid 20s. a ton; but in 1897 coal was bought at 6s. 3d., notwithstanding all the combination of the miners. Therefore he had very good hopes that history would repeat itself, and that before long they would see coal at very nearly its old price. While upon this subject, and as the Governor had asked for a little comfort on the matter, he thought he might say that he could see a great deal of comfort. There were obvious signs that coal must fall a good deal in price before long. The main cause of the increase of price was the abnormal activity of the iron industry, the same as in 1873; but the demand for iron was now considerably decreasing. Week by week he had noticed that the demand for iron was falling away; and in one district, there had hardly been any new orders in shipping this year. He had seen it stated in a Newcastle paper that last June the exports of iron from Middlesbrough were only two-thirds of what they were in the corresponding period of the previous year; they having fallen from 100,000 to 66,000 tons. Now why was the price of coal kept up? There was a certain amount required in consequence of the war, and the public had been led to expect that the price of coal would be very much higher next winter. Everything was playing into the hands of the coalowner, with the result that the public were induced to buy; and so long as the public continued to lay in a large stock, owners could hardly be expected to reduce the price. He believed that everybody who was selling coal got something out of it—at any rate, most fallacious arguments were given for the deficiency in the supply of coal. He had seen it stated that the deficiency was due to from 15 to 20 per cent. of the miners having been called out as reserves; but this was utter nonsense. There were about 600,000 miners employed in the kingdom; and taking the percentage at 15, this would mean that there were 90,000 reservists. He should like to know what proportion of reservists the remaining six millions of working men in the country had supplied. He thought the proportion was about 2 per cent., and not 15; and this was certainly no reason for keeping up the price. Another reason given was that the railway companies could not supply trucks. All he could say was that the South Metropolitan Company, not being satisfied with the prices asked for coal in the North, looked about, and ultimately bought some from Yorkshire and the Midlands at a lower price; and they asked for a larger quantity to be supplied than they expected to use. The deliveries had been quite up to the mark—indeed, so much coal had been pouring in, that they did not know what to do with it; and in the result they had to ask coalowners to defer deliveries, as the coal could not be taken. This got rid of the suggestion that there was a deficiency of coal waggons. All these things pointed to the fact that the price of coal must come down. He had been asked by a coal agent to make a three years' contract at 13s. 6d.; but he laughed at the suggestion. The Chairman had stated that the Company had paid £150,000 more for coal; but they had got £154,000 in the shape of profit.

The Governor: That was for the last half year.

Mr. Livesey said it was also stated that the increase in the cost of coal was partly due to their having had to buy because contractors had fallen short in their deliveries; but when a company bought coal at 8s. a ton and the contractors could sell it at 10s., it was not to be expected that they would keep up the deliveries. The South Metropolitan Company last winter nearly ran out of coal, and had to buy at 15s. a ton. The £150,000 extra paid for coal, of course, included oil; and oil was now nearly double what it was two or three years ago. If the statement went forth that £154,000 had been received in the shape of profits, the public would want to know the justification for the increase in the price of gas. The answer was that the increase in the price of coal had not come upon them yet, because the extra price only came upon them at Midsummer. When the sliding-scale was first proposed, the argument used against it was this—that it would enable the Company to pay higher dividends, which they had done without increasing the price of gas. When the

sliding-scale was introduced, the proportion was something like 3 or 4 to 1; the consumer got three or four parts of the advantage, and the shareholders one part; and as consumers had had the benefit one way, they must now put up with the inconvenience. If it was made clear to the consumer that the sliding-scale was a fair thing—that while they had the advantage on one side they must not grumble if it went against them for a short time—he was sure they would not object. His own impression was that it was not the consumers who objected, but the London County Council, who were not particular in what they said about the Gas Companies. The more it could be made clear that the sliding-scale was an advantage, the better it would be for everyone.

Mr. GIBBONS said it had been stated that the price of gas was less on the south side of the river than on the north, and that if the price was made the same there would be no dividend left. He would like to have some further explanation upon this point.

The GOVERNOR, in reply to Mr. Gibbons, said it had been given in evidence, and it had been published over and over again, that there were several reasons why the price of gas in the north was necessarily higher than in the south of London. The most important one was the amount of capital. The Gaslight and Coke Company were nearly a hundred years old, with a quantity of obsolete capital, which could not be struck out (having been subscribed *bonâ fide*), and on which dividends had to be paid. The amount of capital per ton of coal, or per 1000 cubic feet of gas, was higher than in the case of the South Metropolitan Company. The reason the increase in consumption was not so great, was that the district of the Gaslight and Coke Company was more completely filled up; and they also had competition from the electric light. They had higher rates to pay too; and the gas had been tested more strictly, which had necessitated a greater amount of enrichment. He was glad to hear what Mr. Livesey had said about the question of coal, and the comfort he had offered to the shareholders. He could confirm very much of what Mr. Livesey had said. The fact of the matter was that the British public, when prices went up, got into a "funk;" and "funk" was the most expensive luxury anyone could indulge in. A strong piece of testimony to this was that during the last few weeks the coal traffic of the Great Eastern Company had gone up by leaps and bounds, as the people in the suburbs were filling their cellars. When the cellars were full, he thought it very likely that prices would drop. He was certain that people in the North, who always understood the signs of the times better than those in the South, were of opinion that the tide had turned —that the boom had reached its height, and that the trade of the country in iron was on the down-grade. This must bring about a reduction in the price of coal; but it would not be just yet. It would be folly in him to hold out any hopes to the shareholders that they would get a cheaper price within the next few months. Their own course was pretty well chalked out for the next two half years. Mr. Livesey had said nothing about the proposed sale; but that, of course, was out of their hands now. They would not put anything about it into their Bill. If it was to take place, powers must be conferred upon the buying Company to raise the necessary capital. Mr. Jones had referred to water gas being used as a matter of economy; but the use of water gas was strictly governed by Parliament. There was no legislation at present; but there had been an inquiry, and it would be extremely foolish to prevent legislation upon the point. Mr. Jones had also referred to the abuse which the Company got; but the Company were accustomed to that. Anonymous letters by the score had come to them; and as an instance of this sort of thing, he might read one which he had just received. The notice was returned with a red-ink comment: "You are worse than highway robbers." Mr. Monk had asked what hope the Company had of getting fresh capital next year; and in reply he might state that the facts were these: As regarded the recommendation of the 1899 Committee that the sliding-scale standard price should be reduced from 3s. 9d. to 3s. 3d., if that was applied to new capital there could be no objection beyond this—that it would be a more costly way of raising capital than by 3 per cent. debentures. There was an intention on the part of those who opposed it to read the recommendation as retrospective; and the whole *crux* of the question was this: Was Parliament going to read the recommendation retrospectively? If it did, the new scale would deprive the Company of their right to pay the 10 per cent. standard dividend; and this would mean a loss to the shareholders of £67,000 a year. If the dividend were reduced by 10s. the amount produced would be under £85,000, which would take 1d. off the price of gas. It would be an absolute breach of public faith. The capital of the Company was subscribed originally on the terms of a 10 per cent. dividend, with a right to participate in allotments of stock which was at premium, giving something to the shareholders for back-dividend. In 1876, after protracted discussion, a Bill was brought in by agreement between the Metropolitan Board of Works, the London Corporation, and the Companies supplying gas in the Metropolis, by which the Companies gave up their 10 per cent., which was practically assured to them, because if for any cause they were unable to pay 10 per cent., a Commission was appointed which fixed such a price as would produce 10 per cent. Therefore there was a guaranteed 10 per cent. But this was given up, and the sliding-scale took its place. The Bill was not a contested Bill. It was carried through by agreement between the Companies and the Public Authorities. The Standing Orders of the House were suspended so that the Bill might go through; and the Companies undertook that, if it did not go through, they would not oppose a similar Bill brought in by the Board of Trade for the same purpose. No more solemn bargain was ever entered into than the Act of 1876. If after 25 years, when the public had subscribed the money and bought and sold in the market by tender, the terms were altered and the Act was repealed, it would be a breach of public faith of unparalleled atrocity. He refused to believe that the high court of Parliament, which was the fountain of justice, would be guilty of such an act as that. All they could do was to fully put the case before Parliament; and if Parliament came to the conclusion that the innocent investor should be penalized because of a vague charge of bad management or improvident expenditure of capital in years gone by, then the confidence of the public in any enterprise the capital of which had been raised under Acts of Parliament would receive a blow from which it would never recover. If they brought in a new Bill, it would be on the lines of applying the new scale to the new capital.

The resolution for the adoption of the report was then put, and carried unanimously.

The GOVERNOR next moved a resolution authorizing the declaration of dividends at the usual rates on the preference stock, and of £4 8s. per cent. on the ordinary stock.

Mr. WARD seconded the motion, which was carried unanimously.

The GOVERNOR afterwards proposed a resolution authorizing the Company to dispose of such portions of their property as were not now required for the purposes of the undertaking.

Mr. WARD seconded the motion, which was passed unanimously.

Mr. MONK proposed a hearty vote of thanks to the Governor for presiding, and to the Directors for their management of the Company's affairs.

The resolution was seconded, and carried unanimously.

The GOVERNOR said that, on behalf of his colleagues and himself (and he hoped he might be permitted to include the officers), he begged to thank the shareholders for this renewed expression of their confidence. The Company had passed through a very anxious time; and they had still an anxious time to pass through. But the Directors were upheld by the knowledge that their efforts were appreciated by those who had elected them to their seats.

## CRYSTAL PALACE DISTRICT GAS COMPANY.

The Half-Yearly General Meeting of this Company was held last Friday, at the Albion Tavern, Aldersgate Street, E.C.—Mr. GEORGE LIVESEY in the chair.

The SECRETARY (Mr. Charles M. Ohren) having read the notice convening the meeting, the report and accounts, which were summarized in the "JOURNAL" last week, were taken as read.

The CHAIRMAN: Gentlemen,—It is now my duty to move that the report of the Directors and the accounts be received and adopted, and the report entered on the minutes. We endeavour to give as much information as possible to our shareholders in the report, because we hold that the property belongs to them, and they have a right to know as much about it as the Directors, and as we are able to give within the limits of the report. We find that taking you as thoroughly into our confidence as possible tends to our own comfort, because we always find that shareholders appreciate such treatment. The report, as no doubt you have noticed, is in some respects very satisfactory. The large increase of 11 per cent. in the quantity of gas sold over the corresponding half year is very unusual. I think part of that is due to the fact of the price of gas being kept down during the greater portion of the six months, while the price of coal last winter rose very materially; and people, I imagine, have used gas for cooking and heating to a greater extent in consequence of the high price of coal. However, that will not account for the whole of the 11 per cent., which, I think, is an indication that the business of the Company is in a very healthy condition. But the main burden of my remarks to-day is on this all-absorbing question for gas companies—the price of coal. The report says that once only in the history of the Company has this price been exceeded, and that was in 1873. The price of coal at that time, free on board in the Tyne, rose from 6s. a ton in 1871 to as much as 20s. in March, 1873. It soon, however, began to drop; and before six months had elapsed, it had gone down 4s. However, the contracts were made at the high price in March, I suppose, though I was not on the Board at the time, and, therefore, the Company were in for high prices for twelve months. Now, on this occasion we find that prices have gone up very much, though not quite to so large an extent, but from about the same starting-point. In 1897, the price of coal was about 6s. 3d. to 6s. 6d. a ton, free on board; and it has gone up to 8s. last year, and to 16s. this year for Newcastle coal, whence the Company drew their supplies exclusively. Seeing that the price has advanced to such a great extent, we were looking about us, and a coal agent called and suggested our getting coal from the Midlands. We found that it would be advantageous to do so, that we should get our coal at a somewhat lower price than the North Country coal was costing, or rather the price that they were asking for the North Country coal; and we are taking all our supplies for the present from the Midland district, with a decided advantage to the Company. I may say that our contracts expire at Lady-day; and we have had to pay the high price for coal for the last three months of the half year. It is no use taking the absolute figure of the total amount paid, and comparing it with last year, because last year we had no water gas. It is called "oil gas" in the report; but I do not think it is much use calling it "oil gas." The proper term for it is "carburetted water gas." That is rather a long name; but to call it "oil gas" is misleading. It really ought to be "water and oil gas," for the *corpus*, or substance of the gas, so to speak, is made by the decomposition of water and coke; and the illuminating power is given to it by petroleum spirit. In June, 1899, we had no water gas; but in the June half of 1900 we made a considerable quantity of it—something like 88 million cubic feet out of 600 million feet. So that it is no use taking the total amount paid for coal, and comparing that, because it would be rather misleading. According to the accounts, we paid £39,675 for coal in June, 1899, and £46,648 for the half year now under review; but if we had used all oil gas, it would be a good deal more than £46,000. The proper way, therefore, to take it is to take the price per ton; and though the advanced price only took effect in the latter three months of the half year, still it gives an average advance on the half year of 3s. 4d. per ton. The price of coal for the half year to June, 1899, was 13s. 11d.; and for the half year we are now dealing with it was 17s. 3d., or nearly 17s. 4d. per ton. This advance of 3s. 4d. a ton is the average for the whole half year, though the increased price was only paid for three months. The question that everybody is asking is: Is this price of coal going to be maintained? I believe that, as in 1873 so in 1900, the price of coal must fall, and must fall at no distant date. Of course, coalowners and coal merchants are doing everything in their power to keep up the price—to induce people to lay in stocks at this high price, under the impression that if they do not they will have to pay a great deal more in the winter. I heard it remarked to-day, at the meeting of another Gas Company which I attended, by Colonel Makins, who is the Deputy-Chairman of the Great Eastern Railway Company, that the Company (the Great Eastern Railway) was not a coal-carrying railway, but that lately there had been an enormous amount

of coal brought over the line for the domestic supplies of the southern and south-eastern counties—much larger than they are accustomed to—and that this was due to the public, under the dread that coal is going to be a great deal higher, laying in their stocks now preparatory to the winter. I do not believe it is going to be higher. I believe it is coming down; and my reason for thinking so is that the great cause of the increase in the price of coal was the enormous development and activity of the iron trade. It was so in 1873, and it has been so again last year, and this. That is the main cause; but now the iron trade is rapidly falling off; and the output of, and demand for, iron is month by month and week by week becoming less and less. One illustration may be given in proof of this. Every week I read "The Times" market reports; and I have noticed that in the Clyde district there have been scarcely any orders for new shipping the whole of this year. They have been completing their old orders; but new ones are very scarce indeed. And I think I saw last week that in that district there had only been booked in the last month an order for one ship. The same remark also applies to the North-Eastern coast. I, therefore, think that it will not be long before the price of coal comes down. It will not come down to the old price of 1897 just yet; but I think there will be a material drop within—I will not say what time—but not a very long period. The other items of the accounts, I think, are very satisfactory. As I have mentioned the carburetted water gas, I think I ought to give a little more explanation on that point. So far, we have not found that water gas is anything near so cheap as coal gas; but there is this to be said—that whereas with water gas we have paid a high price for oil during the whole of the year, as I have said, the price of coal has only reached its highest just now. We have given all the figures showing the cost of manufacturing this oil gas—the oil, the coke, the labour, the purification, and the quantity of oil gas made—which works out to 1s. 7d. per 1000 cubic feet; and the corresponding figure for coal gas is only 11·3d. (say 11¼d.), against 1s. 7d. It is true that to be charged against the coal gas there would be a greater amount for repairs; but I find that our total repairs to works only amount to about 4½d. per 1000 cubic feet, and I do not think more than one-third of that would be due to retorts—say, 1½d. per 1000 cubic feet due to repairs of retorts, and another ½d. per 1000 feet for interest on the larger amount of capital required for coal-gas plant. Add 2d. to our 11¼d., and we get 13¼d. for coal gas, against 1s. 7d. for water gas. The next item I would refer to is the question of carbonizing wages; and here I am bound to say the statement I have to make is very satisfactory. Three years ago our carbonizing wages cost us 3s. 6d. per ton of coal. They have been gradually coming down half year by half year to 3s. 4d., 3s. 3¼d, 3s. 1d., and 3s.; and now they are down to 2s. 4d. per ton of coal for the coal gas—from 3s. 6d. to 2s. 4d., or a reduction of one-third. The reduction would have been even more than that, because in the interim we have raised the stokers' wages about 2½d. a ton, or 7½ per cent.; so that if you take the 2½d. off, we should get our carbonizing wages down to 2s. 1½d., against 3s. 6¾d. three years ago. Now how is that brought about? Of course, it is largely due to the increased use of machinery in the retort-houses for charging the retorts and removing the coke; and another thing I am bound to refer to is that it is due to the good working of the men. It is no use having first-rate machinery unless your men are willing to work it to the best advantage; and though the greater part of this improvement in the cost of carbonizing is due to the use of machinery, still a not inconsiderable part is due to the willingness of the men to do their best in working. I do not know that there is much else that I need refer to, except the increase in the price of gas. We have been obliged to increase the price of gas, but not so much as our neighbours; and the reason for that is that we are in rather a better position than some of them. We have a very large reserve fund. Comparing our reserve fund with that of the South Metropolitan Company, this Company have a reserve fund equal to two years' dividends. The South Metropolitan Company's reserve fund is only equal to six months' dividend. Consequently, our reserve fund is such that we may contemplate drawing upon it to some extent to meet the deficiency caused by the high price of coal. Then we have a certain amount of undivided balance. We shall carry forward about £4800. That will help us; and the remainder of the deficiency caused by the increased price of coal will be borne partly by a reduction of dividend—our dividend will be reduced slightly next half year—and partly by a reduction of the profit-sharing of the employees. It may seem rather hard upon them; but it is part of the bond. We undertook to give them a certain percentage on their salaries and wages for every 1d. that gas is sold under 3s. We were down to 2s. 6d.; and their bonus amounted to 6 per cent. We have now gone up to 2s. 10d., and their bonus will only amount to 2 per cent. They lose two-thirds of it. How have they taken it? They have taken it as the consumers have taken it, and as I am sure the shareholders will take it—in a proper spirit. They say: "We have had the smooth, we must put up with a little of the rough." They say: "It is not the Company's fault; and we will do our work just as cheerfully as before." Then as to the way that the consumers have taken the increase in the price, I will read extracts from a couple of letters we have received. We explained that the increased cost of coal would add 8d. per 1000 cubic feet to the cost of making gas, but that we saw our way to meet half that by drawing from our undivided balance and our reserve fund, by a reduction in the dividend, and by a reduction in the profit-sharing bonus, which together would cover about half the extra cost; and we called upon the consumers to bear the other half in the shape of an increase in the price they paid for the gas of 4d. per 1000 cubic feet. We explained this in a circular which I have in my hands; and this has elicited a few letters from our customers, but none of them uttering a word of complaint. One gentleman writes: "May I be permitted, after reading the circular which accompanied the accounts, to express appreciation of the efforts made by your Company to meet the difficulties arising from the enhanced price of coal?" Another one writes: "I think your explanation of the rise in the charge for gas is very satisfactory. It is a nuisance having to advance prices; but you have acted as fairly as possible." There are other letters of the same kind. That, I think, is very satisfactory indeed, as coming from our consumers.

Dr. Frederic Hetley seconded the resolution, which, after some remarks from Mr. H. E. Jones, was put and carried unanimously.

The Deputy-Chairman (Mr. F. Lane Linging) then moved that a dividend for the half year ended June 30 be declared at the rate of 5 per cent. per annum on the preference stock, and 5¼ per cent. per annum on the ordinary stock.

This was seconded by Mr. Robert Morton, and carried unanimously.

The Chairman said he might explain that the 5¼ per cent. was the exact dividend to which they were entitled with the advanced price of gas. The price was advanced 2d. last March. In the previous half year they paid ½ per cent. less than they were entitled to.

Mr. Jones proposed a vote of thanks to the Chairman and Directors for their management of the Company's business, which, having been seconded, was passed unanimously.

The Chairman, in returning thanks, said the Directors took this vote as a sincere expression of the proprietors' approval of their conduct of the business during the half year. He then proposed a hearty vote of thanks to Mr. Shoubridge, the Engineer, and his staff, including the foremen and workmen, with which vote he wished to couple the name of Mr. Ohren, the Secretary. He felt that all had done their best to steer the good ship through very troublous times.

The Deputy-Chairman seconded the vote, which was carried.

Mr. Shoubridge and Mr. Ohren having returned thanks, the proceedings terminated.

## MR. A. J. BALFOUR ON THE COAL QUESTION.

The First Lord of the Treasury (the Right Hon. A. J. Balfour) visited Cambridge last Thursday for the purpose of inaugurating the summer meeting of the University Extension students, and delivered to a large audience in the Senate House a highly interesting address on "The Nineteenth Century." Dealing with the subject of the union of science and invention, he said he did not propose to attempt any sketch of our gains therefrom, but he would make one remark on an aspect of it which was likely more and more to thrust itself unpleasantly on our attention. He then went on to deal with the penalty we have paid for our industrial development; his remarks on this subject being as follows: "Marvellous as is the variety and ingenuity of modern industrial methods, they almost all depend in the last resort upon our supply of useful power; and our supply of useful power is principally provided for us by methods which, so far as I can see, have altered not at all in principle, and strangely little in detail, since the days of Watt. Coal, as we all know, is the chief reservoir of energy from which the world at present draws, and from which we in this country must always draw; but our main contrivance for utilizing it is the steam-engine, and, by its essential nature, the steam-engine is extravagantly wasteful. So that, when we are told, as if it was something to be proud of, that this is the age of steam, we may admit the fact, but can hardly share the satisfaction. Our coalfields, as we know too well, are limited. We certainly cannot increase them. The boldest legislator would hesitate to limit their employment for purposes of domestic industry. So the only possible alternative is to economize our method of consuming them. And for this there would, indeed, seem to be a sufficiency of room. Let a second Watt arise. Let him bring into general use some mode of extracting energy from fuel which shall only waste 50 per cent. of it, and lo! your coalfields, as sources of power, are doubled at once. The hope seems a modest one, but it is not yet fulfilled; and therefore it is that we must qualify the satisfaction with which at the end of the century we contemplate the unbroken course of its industrial triumphs. We have, in truth, been little better than brilliant spendthrifts. Every new invention seems to throw a new strain upon the vast, but not illimitable, resources of Nature. Lord Kelvin is disquieted about our supply of oxygen; Sir William Crookes about our supply of nitrates. The problem of our coal supply is always with us. Sooner or later the stored-up resources of the world will be exhausted. Humanity, having used or squandered its capital, will thenceforward have to depend upon such current income as can be derived from the diurnal heat of the sun and the rotation of the earth till, in the sequence of the ages, these also begin to fail. With such remote speculations we are not now concerned. It is enough for us to take note how rapidly the prodigious progress of recent discovery has increased the drain upon the natural wealth of old manufacturing countries, and especially of Great Britain, and, at the same time, frankly to recognize that it is only by new inventions that the collateral evils of old inventions can be mitigated; that to go back is impossible; that our only hope lies in a further advance."

**Suffocation by Gas.**—An octogenarian named Mrs. Hope, who resided alone at 67, Love Lane, Heaton Norris, was asphyxiated by gas last Tuesday. A neighbour, who thought it unusual that the old woman was not to be seen, burst open the back door, and found the house full of gas. Mrs. Hope was in bed in an unconscious state, and the gas was full on. Death occurred later in the day, despite medical attention.

**The Saltley Gas-Works Accident Fund.**—In the volume of the "Journal" for the second half of the year 1889, we recorded a serious accident at the Saltley Gas-Works of the Birmingham Corporation. A number of men were engaged in repairing a gasholder, the water in the tank of which was very foul. Two of the men—Joseph Beswick and Thomas Case—becoming overpowered by the fumes while in the holder, an attempt was made by two of their mates, named Smith and Chew, to rescue them. Beswick was drawn up, but Case could not be released from his position. As the rescuers were feeling the effects of the fumes, they made an effort to reach the top of the holder by means of a rope ladder. Smith was successful, though much exhausted; but Chew was overpowered, lost his hold, and fell back into the tank. Beswick and Smith were removed to the hospital, and ultimately recovered; and the lifeless bodies of Case and Chew were subsequently brought up. The account of the accident which appeared in the papers excited great public interest; and a relief fund was started which reached a total of £1032. A statement of account which has just been published by the Hon. Secretary of the fund (Mr. A. W. Smith) shows how the money has been disposed of. Mrs. Case was allowed 15s. per week until her death; her children receiving weekly amounts up to June 28 last. The total payments have been £212 18s. Mrs. Chew was allowed 15s. per week until her re-marriage, and 5s. per week afterwards till June 29 last; the total payments to her having been £339 5s.

# PREPAYMENT METERS.

CHANGING PRICE.
MOST SIMPLE.
NO WHEELS OR PARTS REQUIRED.

## THIS METER CAN BE ALTERED *in situ.*

### INSTRUCTIONS.

The Brass Plate has holes around its edge, numbered; these indicate the feet delivered for the Coin used.
To set the Meter, note Figs. I., II., III., IV.

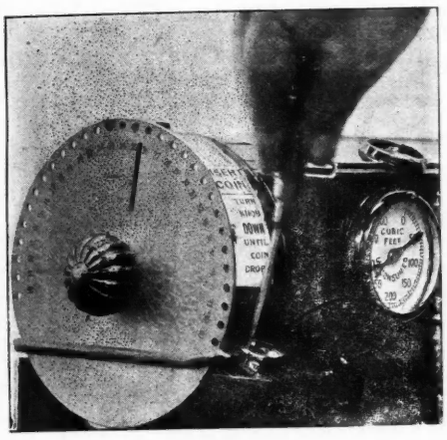

Fig. I.
Break Company's Seal and Remove Screw—THUS.

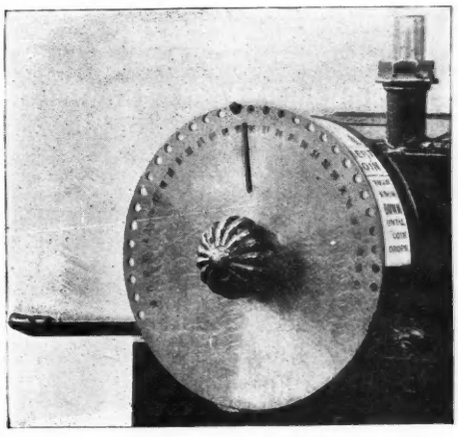

Fig. II.
Swing Band Back—THUS.

Fig. III.
Lift Plate Off—THUS.

Fig. IV.
Replace Plate—THUS.

Swing Band Forward—Replace Screw—and Re-seal.

NOTHING SO EASY. NOTHING SO ACCURATE.

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# A "NEEDFUL" EXPLANATION.

We note an Advertisement in the "JOURNAL," under the name of the NEW CONVEYOR COMPANY, stating that they had taken over the business of the AUTOMATIC COAL-GAS RETORT COMPANY, LIMITED; and, as it may create a false impression, we beg to say there are **NO VALID PATENTS** existing in connection with Inclined Retorts (beyond a few small and subsidiary ones, dealing with details).

We are prepared to erect Inclined Retort Plants, with Conveying and Elevating Machinery, Overhead Tanks, Hoppers, and Measuring Chambers, complete and **FREE OF ROYALTY.** In the list of places given, only a few were erected by the New Conveyor Company—nearly all the remainder being erected by the undersigned.

**JONAS DRAKE & SON, OVENDEN, HALIFAX.**

**GRAHAM, MORTON, & CO., LIMITED, LEEDS.**

**W. J. JENKINS & CO., LIMITED, RETFORD.**

**WINSTANLEY COMPANY, COVENTRY.**

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**OVER 80 (4 in. to 36 in. inclusive) SUPPLIED.**

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Most compact and convenient.
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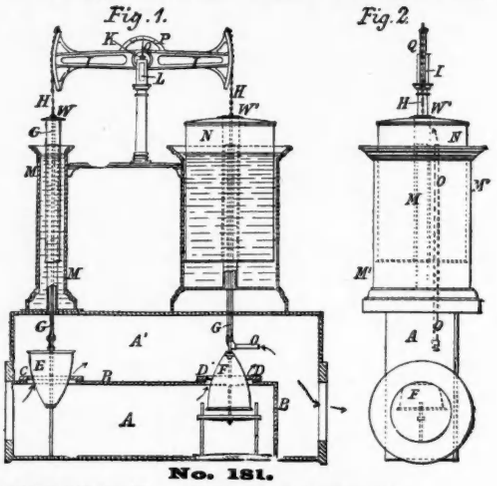


No. 181.

**WHEN THE GOVERNOR IS FITTED WITH**

## BRADDOCK'S PATENT "SELF-LOADING" APPARATUS

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## THE SULPHATE OF AMMONIA COMMITTEE.

The Third Annual General Meeting of this Committee was held last Tuesday, at No. 4, Fenchurch Avenue, E.C.—Mr. W. G. Blagden, the Chairman, presiding.

The minutes of the previous meeting were confirmed; and the report for the past year (which was given in full in last week's number of the "Journal," p. 301) was taken as read.

The Chairman, in moving that the report be received and the accounts adopted, said that, as so very few of the members were able to attend the meetings, he had always thought it desirable to make the report as ample as possible; and therefore he had very little to add to it. The past year had been principally distinguished by the rather large amount of work they had had in connection with the printing and distribution of essays, and by the increase in the number of Agricultural Societies who had undertaken to carry out the Committee's prize competitions. They still had on hand a fair quantity of raw material in the shape of essays, which they might print and distribute if they thought it desirable to do so. But it seemed to be the general opinion that, for the moment, the consumer had as much literature as he could conveniently digest; and therefore that they had better not for the present distribute any more essays. The expenditure of the Committee in prizes for the Agricultural Societies would steadily increase in a normal way; and they might perhaps make it increase more rapidly, if they were to push it. It would be seen from Mr. Hunter's report that, as was the case in 1898, sulphate of ammonia had during the past year carried all before it. The experiments undertaken seemed to prove conclusively that, if judiciously applied in conjunction with other fertilizers, sulphate of ammonia was far and away the best nitrogenous manure, and almost invariably gave the best results, if due weight was attached to the quality as well as to the quantity of the crops obtained. In a tentative sort of way, the Committee had this year begun, with Mr. Hunter's assistance, to carry out some comparative grain competitions—comparative in the sense that alongside the plots to be manured with sulphate of ammonia would be other plots which would be manured with nitrate of soda; and they hoped from these competitions shortly to obtain results which would prove quite as satisfactory as those which were now in the subscribers' hands. Turning to the accounts for the year, it would be noticed with regret that there was a certain falling off in the income of the Committee. This was attributable partly to the fact that one or two subscribers had seceded from the Committee, and partly to the circumstance that in some few instances the make of sulphate had slightly diminished. The Committee had, on the other hand, succeeded in obtaining one or two new subscribers; but at present there seemed to be little prospect of their being able largely to increase the contributions to their funds. With regard to the accounts themselves, there was nothing very striking to note. Owing to the large expenditure which the Committee had had to incur in printing and publishing their essays, they had been compelled to reduce by about £200 their outlay on advertising. It would also be noticed that, in the estimated expenditure for the coming six months, there was an item of £150, which the Committee believed Mr. Hunter would require in organizing the new grain competitions.

Mr. Hanbury Thomas seconded the resolution.

Alderman Miles asked if the secession of subscribers from the Committee, to which the Chairman had referred, was owing to any feeling of dissatisfaction.

The Chairman replied that the gentlemen concerned had not stated that they were dissatisfied. One member seceded because he had ceased to manufacture sulphate of ammonia; and the other gave no reason whatever for his action.

Alderman Miles said he should be very sorry if any feeling of dissatisfaction arose among the subscribers, because he believed the Committee were actuated by the very best motives. Of course, he always looked upon the British farmer as being a very difficult person to move; and if the Committee could move him even very slowly, it was all they could be expected to do. At any rate, every effort was being made to encourage the use of sulphate of ammonia in the United Kingdom. This was a very praiseworthy object, and one that ought to be furthered as far as possible by all makers of sulphate. It was a matter of surprise to him that the Committee did not get more assistance in this way.

Mr. W. R. Chester said he thought it was so palpably in the interests of sulphate manufacturers that they should become subscribers to the Committee, that if the good work done could only be properly brought before them, there might be a considerable increase in the number of members. He understood that some of the large corporations were just about to commence the manufacture of sulphate of ammonia; and he thought it was very desirable that the work of the Committee should be properly brought before them. He referred more particularly to the Corporation of Manchester.

Alderman Miles remarked that a question had been put to him as to what were the objects of the Committee; and before he had an opportunity of explaining to the best of his ability, the further question was asked: "Is it for the purpose of forming a 'ring' to keep up prices?" To this he replied that the sole object of the Committee was to encourage the use of sulphate of ammonia, and so enhance the value of it; and he believed this would be the effect of their labours.

Mr. Hanbury Thomas said he thought it was specially stipulated at the time the Committee was formed that its object was not to be to keep up the price of sulphate of ammonia.

Alderman Miles replied that of course he was aware of this; but the outside public did not always know these things.

The motion was then put, and carried unanimously.

It was next resolved that an Executive Committee be appointed, with full power to appoint officers, to take such steps as they may think fit in the interests of sulphate of ammonia manufacturers, and to levy subscriptions as required on members, not exceeding in the whole 6d. per ton, during the ensuing year.

On the motion of Mr. W. R. Chester, seconded by Mr. Isaac Carr, the Auditors were re-appointed.

A hearty vote of thanks having, on the motion of Alderman Miles, seconded by Mr. W. R. Chester, been passed to the Chairman,

The proceedings terminated.

## BELFAST CORPORATION GAS SUPPLY.

### The Allocation of Profits.

At the Meeting of the Belfast Corporation last Wednesday, the minutes of the Gas Committee contained an intimation that they had passed the following resolution: "That the Council be informed that, having regard to the increased price of coal and oil, and the contracts made therein, the Committee cannot see their way to alter their previous resolutions to carry forward the amount at credit of profit and loss account this year, with the view of avoiding an increase in the price of gas; reserving the question of the application of future profits, when made, for further consideration."

Alderman Dempsey moved, as an amendment—"That £10,000 be allocated out of the gas profits to the Finance Committee for the credit of the general purposes rate." He said he thought the resolution which had been come to by the Gas Committee was a high-handed one. He was one of the deputation from the Finance Committee who waited upon the Gas Committee to make application for a grant; and the matter was then deferred until the accounts had been published. The ratepayers had never obtained any benefit out of the gas undertaking since it was instituted. It had been used to bolster up the extravagant expenditure in the Town Clerk's department. He held that the profits should be allocated for the benefit of the people.

Mr. J. Johnston seconded the amendment, which he thought was a reasonable one. He pointed out that the profits for the last nine months had been £32,000; and, after calculating the increased expenditure on coal and oil for next year, he believed they would still have a profit of £9000 on the working of the gas undertaking, which would make £41,000 to be disposed of at the end of the year.

Mr. M'Innes said, knowing as they did the price of coal, and that Glasgow had had to raise the price of gas, wholly owing to the fact that they had thrown away their reserve fund, he would urge the Corporation, in justice to the consumers, to consider the position carefully before they passed a resolution which would benefit the large ratepayers at the expense of the others.

Mr. J. Thompson remarked that the profits for the twelve months really amounted to something like £53,000. He thought they had an excellent reserve fund when they had written down the whole assets of the undertaking from £1,250,000 to £350,000, though he held that the amount should not have been written down below £500,000. It was really £150,000 taken out of the ratepayers' pockets. The policy in regard to the gas undertaking had always been extremely conservative, and he could not understand it. So much money had been made from year to year, and yet hardly a penny of it went to the ratepayers as it ought to do. In some towns across the water, the entire profits were given to the ratepayers. He held that the profits should be allocated for the benefit of the ratepayers; and, if it was necessary at any time through increased expenditure, they could raise the price of gas.

Alderman Pirrie said in one sense he should be pleased if the amendment were carried; but, as a large ratepayer, he thought it would be absurd to pass an amendment giving back £10,000, when the result would probably be that at the next meeting of the Gas Committee notice would be given to raise the price of gas. This year they had not been able to write anything off for depreciation—it was probably the first time this had happened; and he was not sure that at the end of the year they would have so much in their hands as the Chairman of the Finance Committee imagined. He hoped, under the circumstances, the amendment would be withdrawn.

Mr. Taylor said there was one injustice which seemed to have been overlooked. The profits of the gas undertaking were almost entirely made from the small consumers; and now it was proposed to reduce the rates, which would benefit the large consumers, while it would probably lead to an increase in the price of gas. The effect would therefore be that the less wealthy portion of the population would have to pay for the reduction of the rates. This was poor finance. The profits were almost entirely made out of the small shopkeepers. He thought the amendment should be withdrawn.

Alderman Graham objected to the statement that the working classes produced the gas profits. Those classes did not burn gas; they used oil, and very little gas. So far as his impressions went, it was the middle-class ratepayers who enabled them to realize such profits upon the supply of gas. He thought they should allocate the £10,000 in the reduction of the rates. It might be said that this was an unfortunate year to begin doing anything of the kind, as the price of coal was high; but probably in another year it would go down to the usual rate.

Mr. Young said he could state, on the authority of Mr. Stelfox, that if the amendment were passed the price of gas would have to be increased. A statement had been made to the effect that the profits from the gas undertaking for the past nine months were £32,000, and that the profits for the other three months of the year should be one-third of this amount. That, however, was a fallacy. The nine months referred to constituted the part of the year when gas was most extensively used; while in the three months not calculated, the profits were next to nothing, though during those three summer months the fixed charges were still going on. In London, which consumed one-tenth of all the gas used in the country, owing to the increase in the price of coal and oil, the price of gas had been increased 6d. per 1000 cubic feet. This course had been followed by 250 other towns in England and Scotland; and it would have to be followed in Belfast if this amendment were passed. It was really a mistake to say that they had any profits at all. They had already exceeded their expenditure for coal and oil last year by nearly £30,000, and they were as yet only at the fringe of it. They were bound, under the Act of 1874, to allocate the profits to any useful purposes, and they had made grants to Committees when they had been asked for them. As to paying off so much of the sinking fund each year, he agreed with Mr. Thompson that perhaps they should not pay so much away every year; but he could not go with him when he said that, by taking so much off the sinking fund, they had taken £150,000 out of the ratepayers' pockets. Every penny paid off in that way enhanced the value of the gas-works, which belonged to the ratepayers. He urged the Council not to interfere with the resolution passed by the Committee, unless they were prepared at the next Council meeting to deal with a motion to increase the price of gas.

The Lord Mayor said he thoroughly agreed with the principle of the amendment, but he hardly thought the present was an expedient time to try the experiment. The gas-works formed a very valuable asset of the city. They had cost probably upwards of a million of money, and their predecessors had been good enough to write this down to such an amount that the undertaking was practically worth three times as much as it stood for on their books. He thought the Committee should now decide that the amount standing against the gas-works should remain at that sum, and that all future profits should be allocated to the reduction of rates—excepting, possibly, a floating balance which would act as a reserve fund to prevent the price of gas going up and down. If the Committee acted on a principle like this in the future, a very large sum would annually be brought in towards the reduction and relief of the rates. Several towns in England had as much as £40,000 to £60,000 a year from the gas profits, and other corporations had £20,000, £30,000, or £40,000 from electric undertakings. This enabled them to carry out extensive schemes such as they had undertaken in Belfast, but without increasing the rates as they were obliged to do. He thought it would be wise to allow the amendment to be withdrawn, and they could deal with that matter subsequently.

This suggestion not being accepted, the amendment was put to the meeting and declared lost. A poll was then demanded, and this resulted in 14 votes being given for, and 22 against the amendment. It was, therefore, declared lost, and the minutes were adopted.

## MANCHESTER CORPORATION GAS AND ELECTRICITY SUPPLY.

### The Gas Committee's Report—The Question of Deputations.

At the Meeting of the Manchester City Council last Wednesday, the annual reports of the Gas and Electricity Committees were brought up.

Alderman Gibson, in moving the adoption of the Gas Committee's report and statement of accounts (see *ante*, p. 303), said he did not think it necessary to make any lengthy observations. Of course, it was very satisfactory to himself, and to members of the Committee to know that they had had so very successful a year; but it was questionable whether the outlook was so favourable for the next. He, for one, had no hope of doing anything of the kind again; but he was thankful for the blessings they had already enjoyed.

Alderman Rushworth seconded the proposal, which was unanimously agreed to.

In moving the adoption of the Electricity Committee's minutes, Alderman Higginbottom said he thought it desirable to let the Council know what had been done in connection with the Lancashire Electric Power Bill, which they had been fighting before the Commons and the Lords. The Bill was one which sought to obtain authority for the promoters to go through the streets of any borough in Lancashire, virtually without the consent of the Corporation, in order to lay electric mains to serve districts beyond the boroughs. The Manchester City Council decided that the Bill should be opposed, on the principle that they ought to have control over their own streets. The Bill covered Lancashire south of the Ribble, to the borders of Cheshire and Yorkshire; and there were five other Bills of a similar character which had to be considered. These were all remitted to a Special Committee appointed by the House of Commons, and the first sixteen days of the proceedings were expended in listening to evidence on the Durham Bill and the Tyneside Bill. The Committee set out with one object—viz., to establish, if possible, a set of principles which would be applicable to the whole of the Bills. But as the Bills were so very diverse in character, it seemed to him that they had before them a task which they could not fulfil. However, while dealing with the first two Bills, they virtually settled the principles that were to guide their decisions; and when the Lancashire Bill came on for hearing, the Committee made a declaration that they recognized the granting of way-leaves through the streets of boroughs, supplying cheap electricity over large areas, and giving powers to private companies, and decided that in any future Bills which came before them, and especially the Lancashire Bill, evidence need not be given on these points, but must be confined to special circumstances showing why any borough should be exempt. This naturally very much hampered the position of the united boroughs of Lancashire, of which Manchester was one. They did their best, however. The Bills were finally passed by the Select Committee, with certain amendments, which certainly helped the position of the municipalities. After this decision, a conference of the Lancashire boroughs was again held, and it was decided that, so far as united opposition was concerned, no further action should be taken before the Lords Committee; but it was left to any boroughs who pleased to petition separately. He felt it to be the duty of his Committee to petition in the Lords; and they agreed to this course. The Bill was heard before the Lords a week ago. There were seven boroughs petitioning—viz., Manchester, Salford, Liverpool, Bootle, Stockport, Bolton, and Southport. They did not call any witnesses; but the promoters of the Bill brought forward evidence to prove their case. These witnesses were cross-examined on behalf of the boroughs; and the result was that the Committee passed the Bill, but exempted Manchester, Salford, Liverpool, Bootle, and Stockport, and, as to Bolton, stipulated that the mains should not come within 2½ miles of the Town Hall. The result was that Manchester won its case, and the promoters of the Bill could not come into their streets to get to any district beyond. He congratulated the Council on having, at any rate on this occasion, kept command of their streets. They felt deeply in this matter; and very hard work had been necessary to carry their case. He might add that the Council were especially indebted to Mr. Lambert (Chairman of the Street Mains Committee) for the work he had done, at great cost to himself, on the Special Committee representing the Corporation.

Dr. Dreyfus said it would be remembered that at the last meeting of the Council, when the question of a deputation of the Electricity Committee to the Paris Exhibition came up for consideration, he called attention to the large number of persons on the proposed deputation, and it was referred back to the Committee as a kind of instruction—or, at any rate, a wish on the part of the Council—that the number of the deputation should not exceed two, apart from the Engineer. The Committee had now altered the number to four, in addition to the Engineer. He could assure them that the public were taking very great interest in this question of deputations; and he had received numerous congratulations from different people on the action he had taken in trying to reduce the number in this particular case. As the Committee did not seem able to come to a decision that was acceptable to the Council, he thought the Council themselves should fix the number; and he begged to move, as an amendment, that the deputation should consist of the Chairman of the Committee and the Engineer only.

Mr. Johnston seconded the motion.

Mr. J. R. Wilson said he supported the motion with all the strength he had. He considered that two out of the four gentlemen recommended by the Committee would be practically of no use if they went to the Exhibition.

Mr. Batty hoped the amendment would not be passed. He thought that a gentleman like Mr. Lambert, who had sacrificed his time and professional duties in the service of the Corporation, by going up to London in connection with the opposition to the Electric Powers Bill, should not be excluded from the deputation.

Mr. Johnston said that, while he could appreciate Mr. Lambert's services in opposing the Bill referred to, when it came to a deputation of the kind under discussion, they wanted someone with a knowledge of engineering and electricity. Apart from this, he believed in reducing the number of persons sent on deputations.

Mr. Lambert remarked that Mr. Wilson's theory meant that no one was to be a member of a deputation unless he possessed technical knowledge of the subject. If this principle were adopted all round, he would not have had a word to say. But why did Dr. Dreyfus not urge his arguments when the deputations from the Technical Education Committee and the Tramways Committee were sent abroad? Why did he single out the Electricity Committee? So far as he was personally concerned, he did not care at all whether he joined in the deputation or not; but he thought it only right to say that the reason he was put on by the Committee was that he was Chairman of the Street Mains Special Committee of the Electricity Committee. In order to discharge the duties of that office as well as possible, he had endeavoured, during the past twelve months, to master the principles, and to some extent the practice, of electricity, especially with regard to the laying of street mains and the appliances connected therewith. It was thought by the Committee that he ought to be added to the number of those who were going to see the modern appliances connected with electricity at the Exhibition.

Alderman Southern asked how much would have been saved if, before the mains were originally put down, some person with Mr. Lambert's intelligence had ascertained what was the best mode of laying them, and how much it had cost the city to take up and replace mains which had originally been ignorantly laid.

After some further remarks,

Alderman Higginbottom said that, in deference to the wish of the Council, the Committee had reduced the number of the deputation from eight to four, including the Engineer. As for the names submitted, the Deputy-Chairman was always associated with the Chairman, Mr. Lambert was Chairman of the Street Mains Special Committee, and Mr. Rythan was an engineer.

The amendment, on being put to the vote, was lost.

## BROMLEY GAS CONSUMERS' COMPANY.

### The Half-Yearly Report and Accounts.

In the report which the Directors of the above-named Company will submit to the shareholders at the ordinary general meeting next Tuesday, they state that the increase in the make of gas for the six months ending June 30 was upwards of 13 million cubic feet—the largest in any half year since the formation of the Company. They go on to point out that a most serious advance has taken place in the price of gas coal. Two years ago it was purchasable at from 6s. 6d. to 7s. per ton, f.o.b. in the Tyne, whereas similar shipments have this year commanded from 16s. 6d. to 18s. per ton. Fortunately, the Company's coal contracts made last year did not expire until Midsummer. This enabled the Directors to continue the price of gas to the consumers without alteration until that date; but from then an additional 4d. per 1000 cubic feet will be charged. They remark that this advance is moderate in comparison with the increase in price notified by some of the larger companies; and they trust that the better prices concurrently expected for coke and other residuals may, with this small addition, render it unnecessary to make any further advance. On the other hand, should this expectation be disappointed, and the high price of coal be maintained, further changes may become inevitable.

The accounts accompanying the report show that the revenue derived from the sale of gas amounted to £18,776, residuals produced £7110, and the total receipts were £26,841. The expenditure on the manufacture of gas was £14,717 (coals costing £11,225); on distribution, £1078; and on management, £1599—the total expenses being £19,437. The balance carried to the profit and loss account is £7404; and the sum available for distribution is £9126. The Directors recommend the declaration of dividends at the rates of 12 and 9 per cent. per annum upon the 10 and 7 per cent. capital (both subject to income-tax). This will absorb £6555, and leave a balance of £2571 to be carried forward. Under the supervision of the Company's Engineer (Mr. W. Woodward), 12,866 tons of coal and cannel were carbonized in the six months covered by the report; the quantity of gas made being 128,877,000 cubic feet, of which 124,062,200 cubic feet were sold. The residuals produced were: Coke, 12,866 chaldrons; breeze, 1336 chaldrons; and tar, 130,346 gallons. The ammoniacal liquor is worked up into sulphate of ammonia; 110 tons of the latter having been produced in the past half year.

**Extension of the Incandescent Gas System in Leeds.**—The Lighting Committee of the Leeds Corporation are so satisfied with the application so far of the incandescent gas system for street lighting, that they have decided to substitute it for ordinary lighting in York Road and other thoroughfares.

## THE FINANCES OF THE BRADFORD CORPORATION GAS AND WATER DEPARTMENTS.

The Bradford City Council recently had a Special Meeting to hear from the Chairman of the Finance and General Purposes Committee (Alderman H. B. Ratcliffe) his annual budget statement. After explaining in detail how the estimates of the various Committees were made up, he went on to say that the question of the appropriation of gas profits would doubtless be considered worthy of special reference. There had been appropriated from the Gas Committee's funds in relief of the rates, £386,900; for water-works revenue, £14,000; fire insurance, £15,000; and depreciation of mains and other items, £49,918—making a total appropriation since the commencement of £435,818. The amount proposed to be applied during the current year in relief of the rates was £13,700, as compared with £14,950 last year. The position of the Gas Committee at the close of the year ending March 31, 1901, would probably be as follows: The unappropriated profit on March 31, 1900, was £39,700, and the advance of 3d. per 1000 cubic feet from July 1 last to March 31 next would mean £18,500, or a total of £58,200. On the other hand, the Gas Engineer estimated the increased expenditure in respect of the advance in the price of coal would be £41,928. Deducting from this the normal profit of £20,500 left £21,428 to be provided for, in addition to £5000 for the fire insurance fund, and the £13,700 in relief of rates; making a total of £40,128, against the £58,200, or leaving an estimated amount available on March 31, 1901, of £18,072. Turning to the water-works undertaking, when he brought in the estimates of the Water Committee for last year, he stated that it was calculated their estimated expenditure and receipts would pretty nearly balance. The Committee had during the year paid £142,227 for all purposes, including interest upon the money borrowed for the Nidd Valley extension scheme; and they had received £145,481, leaving an excess of receipts over payments for the year ended March 31 last of £3254—a result which he thought was very creditable indeed in face of the great difficulties with which the Committee had had to contend. Taking the last 29 years, as long a period as would satisfy any reasonable man (figures previous to that the City Accountant did not consider reliable), the Water Committee had received assistance from the Corporation, either in the shape of wa'er or gas profits, to the amount of £56,390. But a very big item had had to be paid for interest and sinking fund on the Nidd Valley scheme. As they knew, by the Act of 1897 they obtained a suspension of the sinking fund for seven years, which term would expire in 1904. But the Corporation had to pay two years' sinking fund before that Act was passed, which amounted to some £16,000 or £17,000. Then they had to pay a large sum for interest on the money borrowed for the Nidd Valley extension, which approached three-quarters of a million; the interest amounting to something over £22,000 a year. Accordingly, they had had to pay during the past few years on unproductive works £85,262. Deducting from this the amount received in aid from all sources (£56,390), left a balance of £28,872, which would have to be spread over the whole of the 28 or 29 years; so that, without these items, a profit on the water-works was shown from that period of, in round figures, £1000 per annum. The amount of money invested in the Nidd works on March 31 last was as follows: Gouthwaite reservoir, £211,426; Gouthwaite lodge, £2939; Ingram reservoir, £1704; lodge and Highwoodale reservoir, £19,673; Nidd aqueduct, £432,372; and Chellow Heights reservoir, £74,717—a total of £742,831. The Corporation had already invested in old works £2,377,758, or a total investment for water-works of £3,120,589. With regard to the coming year, it was estimated that the expenditure on the water-works would again be met by the income account, without having recourse to levying a rate or appropriating trade profits. Formal resolutions were passed approving of the estimates and levying the rates.

## ROTHERHAM CORPORATION GAS AND ELECTRICITY SUPPLY.

### Extensions at the Gas-Works—Commencement of Electricity Works.

Last Wednesday was a memorable day in the annals of Rotherham, inasmuch as two of the undertakings in the hands of the Corporation gave rise to functions at which the Mayor (Mr. G. Gummer), and members of the Town Council officiated. Under the Bill which received the Royal Assent on Monday last week, the Corporation have obtained powers to borrow £65,000 for gas-works extensions. Of this sum, however, about £45,000 has already been expended. Show-rooms and other accommodation have been erected. The old retort-houses have been modernized as far as possible, and are now capable of producing a million cubic feet of gas per 24 hours. The new retort-house is a substantial red brick building of neat design, and is furnished with inclined retorts and the auxiliary machinery. The condensers, exhausters, and purifiers have been provided, as well as a station-meter capable of passing 80,000 cubic feet of gas per hour. The works are complete in every detail, and when in full operation they will be equal to the production of 3 million cubic feet of gas per day. On the arrival of the Mayor and the other members of the party at the works, Mr. G. Winstanley presented his Worship with a silver key, with which the opening ceremony was performed. A vote of thanks having been accorded to the Mayor, he said, in reply, that six years ago the gas-works were considered to be out of date. Since that time, however, a great amount of money had been expended—something like £45,000 having been laid out in extensions, &c.; but he might say that this was a thing which did not fall upon the rates. The gas-works were a big asset of the Corporation. Six years ago the consumers numbered about 4000; but at the present time they were more than 10,000. He went on to speak of the completeness of the extensions, and said he regarded the plant as a model one. The party were afterwards conducted round the works.

Earlier in the day, the Mayor laid the foundation-stone of the generating station in connection with the electric power and lighting scheme for the borough. In 1898 the Corporation obtained an electric lighting Provisional Order, and shortly afterwards called in Professor Kennedy to advise. They adopted his report in January, 1899, and appointed him Engineer of the work. A site consisting of 22,110 square yards was

## GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 343.

| Issue. | Share | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment | Issue. | Share | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| £ | | | p. c. | GAS COMPANIES. | | | £ s. d. | £ | | | p. c. | GAS COMPANIES. | | | £ s. d. |
| 590,000 | 10 | Apl. 11 | 10½ | Alliance & Dublin 10 p. c. | 18—19 | .. | 5 10 6 | 60,000 | 5 | Feb. 23 | 7 | Ottoman, Ltd. . . . | 5—5½ | .. | 6 7 3 |
| 100,000 | 10 | ,, | 7½ | Do. 7 p. c. | 13—14 | .. | 5 7 2 | 500,000 | 100 | June 1 | 6 | People's Gas of Chicago 2nd Mtg. Bonds. | 103—106 | .. | 5 13 2 |
| 300,000 | 100 | July 2 | 5 | Australian 5 p. c. Deb. . | 101—103 | .. | 4 17 1 | | | | | | | | |
| 200,000 | 5 | May 16 | 6 | Bombay, Ltd. . . . | 6—6½ | .. | 4 12 4 | 851,070 | 10 | Apl. 27 | 7 | River Plate Ord. . . . | 10—10½ | .. | 6 13 4 |
| 40,000 | 5 | ,, | 6 | Do. New, £4 paid . | 4—4½ | .. | 5 6 8 | 250,000 | Stk. | June 28 | 4 | Do. 4 p. c. Deb. . | 100—102 | .. | 3 18 5 |
| 880,000 | Stk. | Feb. 23 | 12 | Brentford Consolidated | 250—260 | .. | 4 12 4 | 250,000 | 10 | Apl. 11 | 8 | San Paulo, Ltd. . . . | 1½—12½ | .. | 6 8 0 |
| 270,000 | ,, | ,, | 9 | Do. New . . . | 182—187 | .. | 4 16 3 | 135,000 | Stk. | Mar. 14 | 10 | Sheffield A. . . . . | 246—247 | .. | 4 1 0 |
| 50,000 | ,, | ,, | 5 | Do. 5 p. c. Pref. . | 140—145 | .. | 3 9 0 | 209,053 | ,, | ,, | 10 | Do. B. . . . . | 244—246 | .. | 4 1 4 |
| 159,375 | ,, | June 14 | 4 | Do. 4 p. c. Deb. . . | 116—120 | .. | 3 6 8 | 447,427 | ,, | ,, | 10 | Do. C. . . . . | 244—246 | .. | 4 1 4 |
| 220,000 | Stk. | Mar. 14 | 11½ | Brighton & Hove Orig. . | 225—235 | .. | 4 17 10 | 5,641,885 | Stk. | Feb. 23 | 5½ | South Metrop., 4 p.c. Ord. | 126—129 | .. | 4 2 7 |
| 226,320 | ,, | ,, | 8½ | Do. A. Ord. Stk. . | 160—165 | .. | 5 3 0 | 1,520,000 | ,, | July 12 | 3 | Do. 3 p. c. Deb. . . | 94—97 | .. | 3 1 10 |
| 999,500 | Stk. | Feb. 23 | 5 | Bristol, 5 p. c. max. . | 125—130 | .. | 3 16 11 | 380,940 | Stk. | May 16 | 5 | Southampton Ord. . . | 115—120 | .. | 4 3 4 |
| 420,000 | 20 | Mar. 29 | 10 | British . . . . . | 39—41 | .. | 4 17 7 | 70,825 | ,, | July 12 | 4 | Do. 4 p.c. Deb. | 117—122 | .. | 3 5 7 |
| 60,000 | 10 | Feb. 23 | 12 | Bromley, Ord. 10 p. c. . | 24—26 | .. | 4 12 4 | 120,000 | Stk. | Mar. 14 | 6 | Tottenham A. 5 p.c. and B. 3½ p.c. | 103—108 | .. | 5 11 1 |
| 70,000 | 10 | ,, | 9 | Do. 7 p. c. . . . . | 19—21 | .. | 4 5 8 | 250,520 | ,, | ,, | 4½ | | 80—85 | .. | 5 5 11 |
| 500,000 | 10 | May 16 | 6 | Buenos Ayres (New) Ltd. | 8⅞—9½ | .. | 6 9 9 | 55,100 | ,, | June 14 | 4 | Edmonton 4 p. c. Deb. | 111—115 | .. | 3 9 7 |
| 220,000 | Stk. | June 14 | 4 | Do. 4 p. c. Deb. . | 99—101 | .. | 3 19 3 | 182,380 | 10 | Jan. 12 | 5 | Tuscan, Ltd. . . . . | 7—8 | .. | 6 5 0 |
| 150,000 | 20 | July 12 | 8½ | Cagliari, Ltd. . . . | 23—25 | .. | 6 12 0 | 149,900 | 10 | July 2 | 5 | Do. 5 p. c. Deb. Red. | 98 –102 | .. | 4 18 0 |
| 100,000 | 10 | June 14 | 8 | Cape Town & Dis., Ltd. | 13½—14½ | .. | 5 10 4 | | | | | | | | |
| 50,000 | 50 | May 2 | 6 | Do. 6 p.c. 1st Mort. | 55—57 | .. | 5 5 3 | | | | | | | | |
| 550,000 | Stk. | Apl. 11 | 13½ | Commercial Old Stock . | 270—280 | .. | 4 16 5 | | | | | | | | |
| 286,425 | ,, | ,, | 10½ | Do. New do. . | 205—215 | .. | 4 17 8 | | | | | | | | |
| 288,237 | ,, | June 14 | 4½ | Do. 4½ p. c. Deb. . | 133—138 | .. | 3 5 3 | | | | | | | | |
| 800,000 | Stk. | May 31 | 9 | Continental Union, Ltd. | 153—168 | .. | 5 13 11 | | | | | WATER COMPANIES. | | | |
| 200,000 | ,, | ,, | 7 | Do. 7 p. c. Pref. . | 170—175 | .. | 4 0 0 | 780,404 | Stk. | June 28 | 11 | Chelsea, Ord. . . . . | 285 –295 | .. | 3 14 7 |
| 51,600 | Stk. | Feb. 23 | 14 | Croydon A 10 p. c. . . | 335—340 | .. | 4 2 4 | 150,000 | ,, | ,, | 5 | Do. 5 p. c. Pref. . | 155—160 | .. | 3 2 6 |
| 173,400 | ,, | ,, | 11 | Do. B 7 p. c. . . | 265—270 | .. | 4 1 5 | 160,000 | ,, | ,, | 4½ | Do. 4½ p. c. Pref. '75 | 143—148 | .. | 3 0 10 |
| 556,000 | Stk. | Feb. 23 | 5½ | Crystal Palace Ord. 5 p.c. | 110—115 | .. | 4 11 4 | 175,785 | ,, | Mar. 29 | 4½ | Do. 4½ p. c. Deb. . | 145—150 | .. | 3 0 0 |
| 60,000 | ,, | ,, | 5 | Do. 5 p. c. Pref. . | 13 —135 | .. | 3 14 1 | 1,720,560 | Stk. | Apl. 11 | 7 | East London, Ord. . . | 185—190 | –2 | 3 13 8 |
| 486,090 | 10 | July 27 | 11 | European, Ltd. . . . | 19—20* | .. | 5 10 0 | 654,740 | ,, | June 14 | 4½ | Do. 4½ p. c. Deb. . | 145—150 | +3 | 3 0 0 |
| 854,060 | 10 | ,, | 11 | Do. £7 10s. paid . | 14—15* | .. | 5 10 0 | 390,000 | ,, | ,, | 3 | Do. 3 p. c. Deb. . | 96—98 | .. | 3 1 3 |
| 14,993,075 | Stk. | Feb. 9 | 4⅛† | Gas- 4 p. c. Ord. . . | 97—99 | .. | 4 8 10 | 700,000 | 50 | June 14 | 7½ | Grand 10 p. c. max. . | 106—109 | +2 | 3 8 10 |
| 2,500,000 | ,, | ,, | 3½ | light 3½ p. c. max. . | 95—97 | .. | 3 12 2 | 810,000 | Stk. | Mar. 29 | 4 | Junction 4 p. c. Deb. . | 130—135 | .. | 2 19 3 |
| 2,799,735 | ,, | ,, | 4 | and 4 p. c. Con. Pref. | 116—119 | –½ | 3 7 3 | 708,000 | Stk. | Feb. 23 | 14 | Kent . . . . . | 307—312 | .. | 4 9 9 |
| 3,993,975 | ,, | June 14 | 3 | Coke 3 p. c. Con. Deb. | 94—97 | –1 | 3 1 10 | 160,000 | ,, | ,, | 7 | Do. New, 7 p. c. max. . | 200—210 | .. | 3 6 8 |
| 70,000 | 10 | May 31 | 8 | Hongkong & China, Ltd. | 13½—14½ | .. | 5 10 4 | 1,043,800 | 100 | June 28 | 10½ | Lambeth, 10 p. c. max. . | 275—285 | .. | 3 13 8 |
| 2,800,000 | Stk. | May 16 | 10 | Imperial Continental . | 197—202 | .. | 4 19 0 | 406,200 | 100 | ,, | 8 | Do. 7½ p. c. max. . | 203—208 | .. | 3 16 11 |
| 473,500 | Stk. | Feb. 9 | 3½ | Do. 3½ p. c. Deb. Red. | 100—102 | –½ | 3 8 8 | 350,000 | Stk. | Mar. 29 | 4 | Do. 4 p. c. Deb. . | 130—133 | .. | 3 0 2 |
| 75,000 | 5 | June 14 | 6 | Malta & Medn., Ltd. . | 4½—5 | .. | 6 0 0 | 500,000 | 100 | Feb. 23 | 13½ | New River, New Shares | 415 –420 | .. | 3 4 3 |
| 560,000 | 100 | Apl. 2 | 5 | Met. of 5 p. c. Deb. | 107—110 | .. | 4 10 11 | 1,000,000 | Stk. | July 27 | 4 | Do. 4 p. c. Deb. . | 128 –133* | .. | 3 0 2 |
| 250,000 | 100 | ,, | 4½ | Melbourne 4½ p. c. Deb. | 106—108 | .. | 4 3 4 | *902,300 | Stk. | June 14 | 7½ | South- Ord. . . . | 187—192 | –6 | 3 18 1 |
| 541,920 | 20 | May 31 | 3½ | Monte Video, Ltd. . . | 10½—11½ | .. | 6 1 8 | 126,500 | 100 | ,, | 7½ | wark 7½ p. c. max.. | 182—187 | .. | 4 0 3 |
| 667,946 | Stk. | Feb. 23 | 9½ | Newc'tle & Gatesh'd Con. | 215—220 | .. | 4 4 1 | 489,200 | Stk. | ,, | 5 | and 5 p. c. Pref. | 155—160 | .. | 3 2 6 |
| 299,855 | Stk. | June 28 | 3½ | Do. 3½ p. c. Deb. . | 104—107 | .. | 3 5 5 | 1,019,585 | ,, | Apl. 11 | 4 | Vauxhall 4 p. c. A Deb. | 129 –134 | .. | 2 19 9 |
| 160,000 | 5 | May 16 | 8 | Oriental, Ltd. . . . | 7½—7¾ | .. | 5 8 3 | 1,155,066 | Stk. | June 14 | 10 | West Middlesex . . . | 270 –275 | .. | 3 12 9 |
| 135,000 | 5 | ,, | 8 | Do. New, £4 10s. pd. | 6½—6⅝ | .. | 5 6 8 | 200,000 | ,, | ,, | 4½ | Do. 4½ p. c. Deb. . | 145—150 | .. | 3 0 0 |
| 15,000 | 5 | ,, | 8 | Do. do. 1879, £1 pd. | 1½—1⅝ | .. | 4 11 5 | 200,000 | ,, | Mar. 14 | 8 | Do. 8 p. c. Deb. . | 99—101 | .. | 2 19 5 |
| | | | | | * Ex. div. | | | | | | | | *Ex div. | | |

† Next dividend will be at this rate.

purchased at a cost of £2664. Contracts were entered into for boilers, engines, dynamos, batteries, switch-boards, cables, &c., amounting to £15,138; and in March last the Corporation applied for, and have since obtained, the sanction of the Local Government Board to borrow £27,969. The scheme provides for both private and public (arc) lighting on the three-wire continuous current system. There will be about 35 public lamps. It is estimated that in two years' time the supply will be equal to 105,000 units per annum. Provision is also being made for the generation of power for the electrical tramway system at the same station. The buildings of which the foundation-stone was laid on Wednesday comprise engine and dynamo house, boiler-house, battery-room, engineers' offices and stores, and workmen's room, together with coal-bunkers, chimney-stack, and economizer, and the necessary smoke-flues, water-lodge, &c. The different structures are brick-built with buff terra-cotta dressings, with strong courses of moulded bricks and Lincolnshire yellow bricks. Every provision is being made for future extensions. The Architect (Mr. J. Platts), on behalf of the Engineers and Contractors, presented to the Mayor a silver trowel and mallet, with which he laid the stone, whereon was the following inscription: "Rotherham Corporation Electric Lighting Station. This stone was laid by the Mayor, Councillor G. Gummer, J.P., Chairman of the Electric Lighting Committee, August 1st, 1900. H. Hampton Copnall, Town Clerk; Dr. A. B. W. Kennedy, F.R.S., Westminster, Engineer; Joseph Platts, Architect; W. Thornton and Sons, Contractors, Rotherham." The Mayor said they all knew that for many years Rotherham had been holding back, and had been looked upon by many people as a town without progression; but he thought, considering the work they had in hand, and the number of undertakings in which they were engaged at the present time, it could not be said it was a town without some thought of the future. The electric lighting works would, he hoped, prove as successful an undertaking to the Corporation as any other in which they were interested—and he referred more especially to the gas-works. They felt a particular pride in connection with the illumination of the town. He intimated that it was his intention to ask the Council, at the end of the year, to elect another Chairman of the Electric Lighting Committee, so that there would be competition between the gas and the electricity works—competition which, he hoped, would be for the benefit of the town. He thought it would be better that the two undertakings should be under separate control.

**The Spalding District Council and the Water-Works.**—A special meeting of the Spalding District Council was recently held in connection with the purchase of the water-works. It was decided to raise a loan not exceeding £35,000, repayable over fifty years, for buying the works, and carrying out improvements. The price of the undertaking is £25,000, and there are in addition the costs of promoting the Bill, put at £1000, also £500 compensation to the Clerk to the Water Company. The improvements which it is proposed to carry out include new mains between Spalding and Bourne, the source of supply, and arrangements for increasing the storage at Spalding. The Council will take over the works from October next.

## CLACTON-ON-SEA GAS AND WATER SUPPLY.

### A Successful Nine Months' Working.

Our readers may remember that the Clacton-on-Sea Urban District Council acquired last year, by arbitration, the undertaking of the Gas and Water Company, and entered into possession in June—Mr. Sydney Francis being appointed Engineer and Manager. At a recent meeting of the Council, the Gas and Water Committee presented a report on the result of the working in the nine months ending March 31 last; and it showed considerable improvement on the final twelve months' operations—viz., for the year 1898—of their predecessors. The Company's profits amounted to £2340, whereas those realized by the Council in the shorter period were £3430—an increase of more than 90 per cent.; and it was estimated that they would go up to £4573 for the twelve months. Out of the £3430, there had, of course, to be paid the interest on loans, &c., £2146; leaving a balance of £1284. There was an increase to the extent of 20 per cent. in the sale of gas; but business was not pushed, owing to the inadequacy of the plant to stand any further strain. The Committee estimated that the increase in sales would result in a further £686 of profit. Put shortly, the following is the position: The current financial year started with a balance of £1284. Up to March 31, 1901, they had an estimated profit of £6543, and an expenditure, in principal and interest, of £5691, which would leave a balance in hand on that date of £852. The Chairman of the Committee (Mr. Sidney Smith), in bringing the subject before the Council, said a great deal of credit for the results obtained was due to their Engineer. They had, in fact, excellent officers, yet they were paying £100 less in salaries than the Company. He thought this very satisfactory. As the printed figures were not before the Council, the matter could not be discussed. With regard to the preceding statement as to the inadequacy of the plant, it may be mentioned that during the time Mr. Francis has been at Clacton he has been occupied in practically rebuilding the gas-works, besides extending the water-works. He has laid upwards of 4000 yards of gas and water mains, put in a new 10,000 cubic feet engine and exhauster, by Messrs. George Waller and Co., and a new waggon weigh-bridge, besides erecting an office on the water-works and new and commodious workshops and stores. The storage capacity is being increased by the erection of a two-lift holder, 80 feet in diameter, by Messrs. Cutler and Sons, in a brick and cement tank constructed by Messrs. J. M'Kay and Co., and plans are in preparation for a new retort-house with regenerative settings. At the meeting of the Council last Wednesday, they showed their appreciation of their Engineer's services by increasing his salary £50 per annum.

The cartmen employed at the New Wortley Gas-Works of the Leeds Corporation recently applied for an increase of 2s. a week in their wages and for one week's holiday, with pay, each year to men of not less than twelve months' service. The Gas Committee have decided to grant an advance of 1s. a week, but not to entertain the other proposal.


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*Hot-Plate and Oven Burners, Fixed or Removable at will.*

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## ELECTRIC LIGHTING NOTES.

At the meeting of the Crewe Town Council last Wednesday, a long discussion took place upon a proposal to spend an additional £10,000 upon electric lighting. By an overwhelming majority, the Council resolved to go in for the extended area.

The Bradford City Council have adopted a recommendation of the Electricity Committee that application should be made to the Local Government Board for authority to borrow an additional sum of £140,000 for the supply of electricity in the district.

At the meeting of the Leicester Town Council last Tuesday, the Gas and Electric Lighting Committee reported that the total output of current from the central station for the half year ending June 30, was 489,055 units, against 342,327 units in the corresponding period of 1899; being an increase of 146,728 units, or 42·86 per cent.

On the suggestion of Mr. H. D. Munro, their Electrical Engineer, the Exeter City Council have decided to adopt a system of assisted wiring for domestic users of electricity. The plan favoured in Exeter is the one of employing a local firm to do the work; the Corporation making themselves responsible for the cost, and recovering the sum from the customer in instalments spread over three or five years. Mr. Munro advised the Electric Lighting Committee that the practice of carrying out installations themselves has been generally abandoned by corporations, and it is not advisable to revive it. He believes, however, that if the cost of the installation can be provided for on the easy payment system, the number of users of electric light will greatly increase in the city.

Some interesting statistics respecting the German electrical industry have, says the Berlin correspondent of the "Economist," just been published. On the 1st of March there were 652 electrical works in Germany, against 489 at the like date of 1899; and there were 122 works in course of construction, 17 of which have since been finished. The number of German towns having electricity is 900, while only 850 have gas. The rapid progress of the electrical industry is well illustrated by the statement that the ten largest companies, with a combined working capital of £10,900,000 in 1897, have already increased their capital to £40,900,000. The increase of capital is still going on this year. Nevertheless, the writer finds that a somewhat pessimistic tone prevails in the highest electrical circles of Berlin as to the future of the industry. It is felt that the field for electrical development in Germany has already been largely covered.

The Electrical Committee of the Bristol Corporation have submitted a statement of the accounts of the undertaking for the year ending the 25th of March last. The number of consumers on that day was 1215; being an increase of 248 during the year. The number of lamps connected was 85,956 (of 8-candle power), as compared with 68,536 at the corresponding period of the previous year. During the year, a number of motors were connected with the mains. The number of units sold was 1,812,511; being an increase of 449,725. The gross receipts amounted to £31,717, and the gross expenditure to £17,962; leaving a gross profit of £13,755, from which has to be deducted interest on loans and bankers' overdraft, £6019, and repayment of money borrowed, £7590—together £13,609—leaving a balance of £146. The following statement exhibits the financial position of the undertaking on March 25, 1900: Total capital expenditure, £252,588; mortgage debt, £228,730, less £30,110 paid off or set aside, £198,620; balance at credit of reserve fund, £5000; and balance at credit of depreciation account, £2024 17s. 7d.

At last Tuesday's meeting of the Gloucester City Council, the Accountant presented a statement of accounts in connection with the electricity supply works, from which it appeared that the amount of the loan already authorized was £43,450, of which £10,000 had been borrowed at 2¾ per cent. The total expenditure amounted to £30,722, including £6141 on buildings, £7198 for machinery, £1000 for accumulators at stations, £12,279 for mains and laying, £1072 for meters, £800 for electrical instruments, &c., £1495 for Engineer's commission, &c., £496 for general expenses, and £285 for the cost of the Provisional Order. Some discussion took place in regard to extending the public lighting; and it was pointed out that if this were done the ratepayers must pay for the "luxury." With regard to the 44 arc lamps now erected, it was stated that the total cost was £1000 per annum for maintenance; while gas-lamps covering the same area only cost about £150 per annum. The matter was left in the hands of a Committee to ascertain what the cost of lighting the city generally with arc lamps would be.

Mr. John Harris last Thursday laid the foundation-stone of the new electricity supply station, which is being erected by the Board of Works for the Whitechapel district, in Osborn Street, at the same time opening the new refuse destructor which stands on the same site. The two are designed to be used in combination. The destructor consists of 12 cells, each of which is guaranteed to consume not less than 10 tons of refuse every 24 hours. The heat thus produced is to be used to work six boilers, each evaporating not less than 2000 lbs. of water an hour; and the steam obtained is to be employed in driving the electric lighting machinery. The destructor, however, does not afford all the steam required; hence eight Babcock and Wilcox boilers are also to be installed. At present, the Board of Works have about 40 miles of cable laid, and they have in hand applications from intending consumers of electricity which will involve the doubling of the output they can now give. By burning the refuse to generate power, they expect not only to destroy the dust of the district without expense to the ratepayers, but also to make a handsome profit on the supply of electricity.

**The Exmouth District Council and the Water Company.**—At a meeting of the Exmouth District Council last Wednesday, a letter was received from the Water Company giving notice of their intention to cut off the supply of water to the Council for all purposes unless they agreed to pay the sum of £60 for water supplied and to be supplied from the 1st of July to the 1st of December, and also stating that no water is to be used for flushing except after six hours' notice in writing. It was decided to reply that the Council could not pay the sum demanded, and to deny that the Company had any power to make suggestions as to the flushing of the sewers. The Council further resolved to serve notice on the Company for the purchase of the undertaking under the provisions of the Act of this session.

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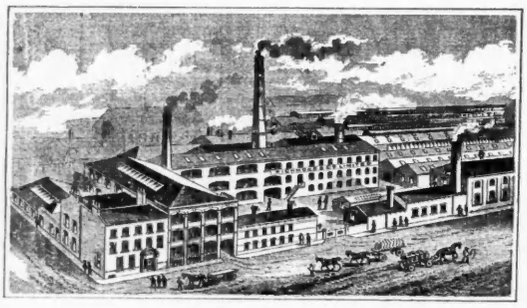
## NOTES FROM SCOTLAND.

**From Our Own Correspondent**

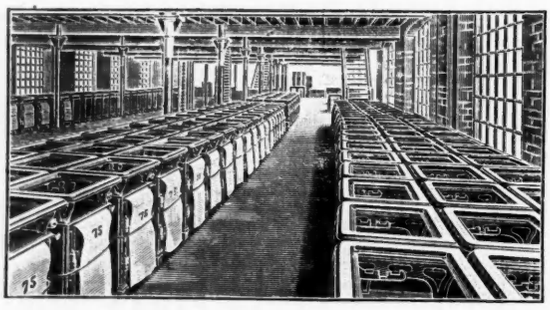
*Saturday.*

The last meeting relating to the financial year of the Edinburgh and Leith Gas Commissioners was held on Monday. The Lord Provost of Edinburgh and the Provost of Leith being both absent on the annual visit of inspection of the lighthouses around the Scottish coasts, Bailie Manclark, of Leith, the Convener of the Finance and Law Committee of the Commission, presided. Almost the only business before the Commissioners was the approval of the accounts for the past year. Speaking to these, the Chairman said that he moved, in accordance with the recommendation of the Finance and Law Committee—"That the abstract of the accounts for the year ended the 15th of May, 1900, having been examined and found correct, the Commissioners do now allow and certify these accounts; resolve to set apart for the annuities' sinking fund a contribution of £9562 16s. 5d., being £1 per cent. in place of the minimum of 15s. per cent. on the capital value of the annuities; to set apart for the mortgages' sinking fund (inclusive of the portion applicable to the Granton works) the contribution of £3787 0s. 4d., being at the rate of £1 per cent. on £378,701 10s. 4d., the whole mortgage debt of the undertaking; and to carry forward to next year the balance of £28,349 7s. 1d." In submitting this motion, he asked to be allowed to congratulate the Commissioners, as well as the communities of Edinburgh and Leith, on the very prosperous year's business they had enjoyed, as shown by the accounts. Considering the keen competition caused by the use of oil and electricity, it would not have been surprising if they had found gas barely holding its own against such formidable rivals. Not only, however, had gas done this, but it had done much more. Taking a two years' comparison, the amount of gas sold for the year closed on the 15th of May last, as compared with that of the 15th of May, 1898, showed an increase of 179,090,900 cubic feet, almost 180 millions. The benefit derived by the increase of gas sold had been accompanied during the past year by a much larger return from residual products than in previous years. These yielded last year the substantial increase of £16,465 9s. 11d. Of that increase, £9000 accrued from tar and ammoniacal liquor, and £7000 from coke. This had brought about the gratifying result, that, though the actual prices paid for coal and oil during the year were considerably in advance of the year preceding, the net cost per ton of coal carbonized and oil, for the year to May 15, 1900, was slightly below that of 1899—a fortunate combination they need hardly expect again for some time to come. Taking these favourable circumstances into consideration, the Finance Committee were unanimously of opinion that two things ought to be done: (1) That the option of withdrawing the Granton capital expenditure from the operation of the sinking fund clause should not be exercised for this year—that represented a benefit to the mortgages sinking fund of about £1000. (2) That the contribution to the annuities' sinking fund be increased from the minimum of 15s. per cent. to 20s., benefiting the fund by about £2400. After giving effect to these recommendations, there remained to be carried forward to this year the favourable balance of £28,350. This, he was quite of opinion, should be agreed to in view of the outlook for the immediate future. They knew that coal and oil were both going up in price, and they hardly knew that they had got to the top price; and consequently they were convinced that it would be well to have a nest-egg to start next year with. The accounts were approved.

Mr. John S. Gibb, the Treasurer to the Edinburgh and Leith Gas Commission, has prepared his annual analysis of the accounts of the Commission for the year ending May 15 last. From this, it appears that the total expenditure upon coal was £103,231, the average price per ton of which was 11s. 4·27d.; the cost per 1000 cubic feet of gas made was 1s. 1·16d., and per 1000 cubic feet sold 1s. 2·27d. Gas oil cost £9969 for 3252 tons, the average price being 1s. 1·16d. per ton, 1·27d. per 1000 cubic feet of gas made, and 1·38d. per 1000 cubic feet sold. Purification and sundries cost 1s. 0·27d. per ton of coal carbonized, 1·18d. per 1000 cubic feet of gas made, and 1·29d. per 1000 cubic feet sold. Salaries at works cost 3·38d. per ton of coal, 0·33d. per 1000 cubic feet of gas made, and 0·35d. per 1000 cubic feet sold. Wages at works cost 4s. 10·38d. per ton of coal, 5·64d. per 1000 cubic feet of gas made, and 6·11d. per 1000 cubic feet sold. Repairs and maintenance of works cost 1s. 5·15d. per ton of coal, 1·66d. per 1000 cubic feet of gas made, and 1·80d. per 1000 cubic feet sold. The total cost of manufacture was at the rate of 20s. 0·61d. per ton of coal, 1s. 11·24d. per 1000 cubic feet of gas made, and 2s. 1·20d. per 1000 cubic feet sold. The total cost of distribution was at the rate of 2s. 2·78d. per ton of coal, 2s. 5·9d. per 1000 cubic feet of gas made, and 2·80d. per 1000 cubic feet sold. Management cost at the rate of 11·67d. per ton of coal, 1·13d. per 1000 cubic feet of gas made, and 1·22d. per 1000 cubic feet sold. The gross cost of gas was at the rate of 25s. 066d. per ton of coal, 2s. 5·04d. per 1000 cubic feet made, and 2s. 7·48d. per 1000 cubic feet sold. Receipts for residuals were at the rate of: Coke, 1s. 5·42d. per ton of coal, 1·68d. per 1000 cubic feet of gas made, and 1·82d. per 1000 cubic feet sold; waste lime, 0·04d. per ton of coal, 0·01d. per 1000 cubic feet of gas made, and 0·01d. per 1000 cubic feet sold; tar, 2s. 11·25d. per ton of coal, 3·40d. per 1000 cubic feet of gas made, and 3·69d. per 1000 cubic feet sold. The total return from residuals was thus at the rate of 4s. 4·71d. per ton of coal, 5·09d. per 1000 cubic feet of gas made, and 5·52d. per 1000 cubic feet sold. After deducting other receipts, the net cost of gas was at the rate of 20s. 6·93d. per ton of coal, 1s. 11·85d. per 1000 cubic feet of gas made, and 2s. 1·85d. per 1000 cubic feet sold. The gross profit was at the rate of 7s. 7·69d. per ton of coal, 8·85d. per 1000 cubic feet of gas made, and 9·60d. per 1000 cubic feet sold. The revenue from gas was at the rate of 28s. 2·62d. per ton of coal, 2s. 8·70d. per 1000 cubic feet of gas made, and 2s. 11·45d. per 1000 cubic feet sold. Contributions to sinking funds, and the cost of annuities, interest on money borrowed and on mortgages redeemed, and the expenses of mortgages were at the rate of 6s. 4·31d. per ton of coal, 7·19d. per 1000 cubic feet of gas made, and 7·81d. per 1000 feet sold. The balance carried forward was at the rate of 4s. 7·65d. per ton of coal, 5·31d. per 1000 cubic feet of gas made, and 5·76d. per 1000 cubic feet sold. The average price per ton of coal given above is arrived at by reckoning the 3252 tons of oil carbonized as 20,428 tons of

*"Noble stock, I'd wish no better choice."—Pericles V.*, 1.



*"Fetch forth the stocks, ho!"—Lear II.*, 2.

## *GAS COOKERS.*

**Charles Dickens amongst his immortalised works has made a piece of coal tell its own history in a fascinating style. Were Charles Dickens alive now, and wished to write up a similar and up-to-date article, he could hardly do better than take a gas cooker as his topic. The writer has very briefly endeavoured to make a gas cooker speak for itself as follows:—**

MY SPEECH.

I am a cooker, known as a "Richmond," size No. 120, to be on hire from the Gas Company for 2s. 6d. per quarter, and about to be exhibited, like a slave in the Market-place of Cairo—"on hire, or for sale."

I have been called a silent servant, and like most domestic servants, I need a moderate share of "gas," but unlike the majority of such, I hold my tongue, do not give "back answers," and am always under control. To prove I am not praising myself without cause, please listen to what Miss Lillie Richmond, the sister of my founder, has to say at the Public Hall. Next week she will practically demonstrate that I am strong, well built, easily managed, with good references, and can cook a dinner at a cheaper rate than Charles Dickens' coal fire. Other virtues I possess are, no smoke, no dust, no smell, as I heard someone bluntly describe them. But now for a page from my diary:—

I was born at Stratford, Essex, a fortnight ago, and am waiting to be sent to . Brothers I have innumerable all around me, and those nearest to me, as I speak, are known as the No. 75's and 100's, who although smaller, are for hire at the same rate. I have an elder brother much bigger, which rents at 3s. How I envy him!

We all come of the same stock and pedigree. From the raw "pig," sent down by barge to London, then put into a large cupola until melted into liquid iron, and run off into a receptacle or cauldron on wheels, which is moved about in the foundry at the will of the foreman. The hot metal is presently poured into bowls held by men and afterwards ladelled into moulded sand. All our parts when we are cool are fitted together and others added, some from one quarter and some from another, till we each have a complete body. Quite a dozen strong men had a go at me, and it was marvellous how I found my feet and felt my sides stand upright, till I was self-supporting and had a bright clean appearance. Before I go out I am to have an enamel crown to wear, a tabulated list of my accomplishments, and how I should be treated.

This is how my diary runs. I want to give you preliminary notice of my coming, so that everyone who reads this may bring their friends and come themselves to see me. I am at home at three o'clock and 7.30 on any day but Sunday in the Public Hall, from Wednesday next for a week.

Ladies and Gentlemen,—Hire me or one of my brothers, and I know you won't be disappointed—

Where first-class cooking must be done,
Try Richmond's "Model"—that's the one.

*From the "Croydon Guardian."*

**The above is an example of our special advertising. Its results are seen in our increasing sales.**

coal. Taking coal alone, the average price per ton was 12s. 9·52d. The yield per ton of coal (making the same allowance for oil) was 10,355 cubic feet; and the gas sold was at the rate of 9484 cubic feet per ton. Gas unaccounted for was at the rate of 7·77 per cent. The average illuminating power was 25·18 candles. The price of gas was 3s. per 1000 cubic feet.

On Wednesday, the Perth Town Council paid a visit of inspection to the new gas-works in course of erection. They were shown over the place by Mr. A. Gillespie, of Glasgow, the Engineer for the work, who explained to the visitors the uses of the different appliances. Refreshments were served, after which Lord Provost MacGregor proposed the health of Mr. Gillespie; and in doing so, he complimented him and Mr. Watson, the Convener of the Works Committee, on the manner in which they were carrying on the work. Mr. Watson, in returning thanks, said it was the desire of the Committee to have the new works making gas in the course of a few months. Mr. Gillespie also acknowledged the toast. The company afterwards drank the health of the Contractors and of Mr. W. B. M'Lusky, the Manager.

The Gas Committee of the Glasgow Corporation have this week agreed to recommend the Town Council, in terms of the report of a Sub-Committee, to increase the price of gas from 2s. 2d. to 2s. 6d. per 1000 cubic feet.

A special meeting of the Forfar Gas Corporation was held this week, for the purpose of considering the annual accounts for the past year, and the estimates for the current year. Provost M'Dougall stated that the Auditor had not yet finished his audit; and, although the estimates had been prepared and circulated, he thought it would be better to adjourn consideration of both accounts and estimates for a week, when, he expected, they would have the Auditor's report before them. The estimates show that £100 was derived from last year's working, and that the price of gas is to remain at 3s. 9d. per 1000 cubic feet.

At a recent meeting of the Directors of the Lochwinnoch Gas Company, it was agreed to raise the price of gas 5d. per 1000 cubic feet. Plans were submitted and passed for alterations at the works, consisting of a new retort-house with regenerative settings. The Directors afterwards visited the works, and expressed themselves as thoroughly satisfied with their condition, and complimented the Manager (Mr. E. Davies) on his successful management since his appointment.

The Milngavie Gas Company held their fiftieth annual meeting on Thursday. It was reported that the make of gas for the year was 13 million cubic feet—an increase of over one million cubic feet upon the previous year. More gasholder accommodation is required. If ground cannot be obtained from neighbouring proprietors, it is suggested that the holder should be erected on the site of the Manager's house and the lawn in front of it; but this, it is felt, would spoil one of the best spots in the town. There are 41 shareholders of the Company, with a holding of £4500, who receive a dividend of 2½ per cent. so long as the price of gas is kept at the same figure—4s. 2d. per 1000 cubic feet. Mr. John Learmont, the Manager, has been in the Company's service forty-one years. On the 1st of December he celebrates his jubilee as a Manager.

At a meeting of the Edinburgh and District Water Trust on Monday, Mr. Wood, of Portobello, Convener of the Finance Committee, submitted the accounts for the past year. He said the results indicated a satisfactory record of the financial progress and prosperity of the undertaking. The revenue from rates alone, including special and meter rates, amounted to £104,893. The revenue in the previous year from those sources was £101,369, which showed an increase for the year of £3529. The revenue from other sources for the year amounted to £5881, as compared with £8754. In the year 1898-99, the repayments on account of expenditure incurred in connection with the tramway operations largely accounted for the difference; there being a corresponding decrease in this year's expenditure on account of tramway operations. The gross revenue for the year amounted to £110,621, to which fell to be added the accumulated balances in favour of revenue; making a total of £139,859. The gross expenditure for the year, including payment of interest and contribution to the sinking fund, amounted to £105,119; leaving a balance in favour of revenue of £5502 for the year, and with the accumulated balance of £34,700. The mortgage debt of the Trust now stood at £1,186,261, an increase over the previous year of £142,595, and there was on short loan the sum of £40,000. Out of the total assessment of £105,302 for the past year, there had been collected £104,695, equal to 99·42 per cent. Mr. Wood concluded by remarking that within a few years the important works now in course of construction would be completed, and the communities assured of an abundant supply of pure and wholesome water for many years to come, and that without any addition to the rates. The accounts were adopted.

The annual meeting of the shareholders of the Airdrie and Coatbridge Water Company was held on Tuesday. The usual dividends of 10 per cent. on the original ordinary £5 shares, 5 per cent. on the ordinary £10 shares, 6 per cent. on the £10 preference shares, and 5 per cent. on the later preference shares, were declared.

**West Bromwich Gas Supply.**—At the monthly meeting of the West Bromwich Town Council last Wednesday, the Gas Committee reported that the sales of gas for the Midsummer quarter were 50,331,775 cubic feet, and the amount of the gas-rental was £6393 9s. 5d., exclusive of public lighting. In consequence of the advance in the price of coal, the Committee recommended that the price of gas be increased, and the following scale of charges adopted, to take effect for the Michaelmas quarter: Gas for motive-power purposes—less than 200,000 cubic feet per quarter, 2s. 3d. per 1000 feet; 200,000 cubic feet and upwards, 2s. For other purposes—less than 25,000 cubic feet per quarter in one building, 2s. 9d.; 25,000 to 50,000 cubic feet, 2s. 7d.; 50,000 to 500,000 cubic feet, 2s. 5d.; and 500,000 cubic feet upwards, 2s. 4d. A corresponding advance in the price to be charged for gas for public lighting purposes. Mr. Bushell, in moving the adoption of the report, said the increase in the sales of gas for the Midsummer quarter was 8¼ per cent. compared with last year. In the face of the heavy increase in the price of coal, they had advanced the price of gas very moderately. An amendment that the recommendation respecting the charge for gas used for motive-power purposes be referred back to the Committee was defeated by a large majority; and the report was adopted.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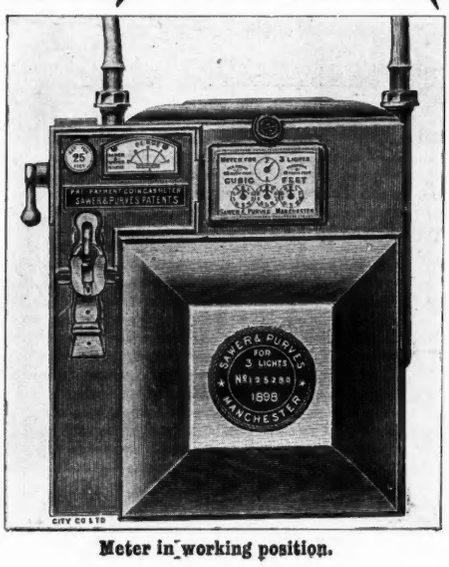
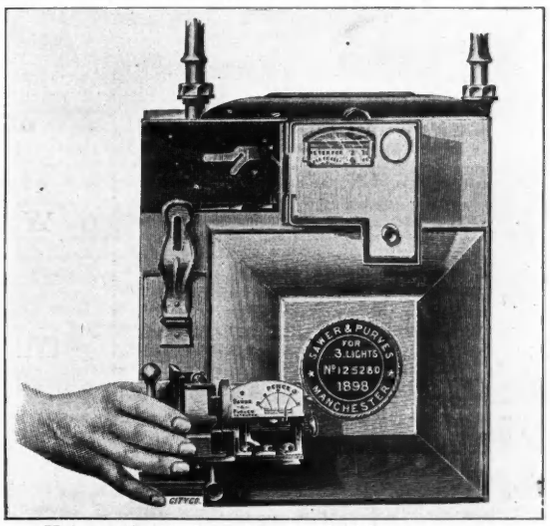



**Meter in working position.**




**Meter with attachment removed without uncoupling.**

## CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Aug.* 3.

**Sulphate of Ammonia.**—There has been a quiet market throughout the week and some decline in value; the closing quotation being £11 to £11 1s. 3d. per ton f.o.b. at the ports. Prompt requirements being satisfied, consumers will not go in unless at a further decline; and parcels offered have been mostly taken for "covering" purposes. There is considerable inquiry for August-September delivery; but in this position, makers will not sell unless at a premium on prompt values. For delivery further ahead, there is less interest; and although a decline on prices recently quoted would now be accepted, no important business is reported.

**Nitrate of Soda** is very firm in all positions; available supplies on the West Coast not being plentiful, tonnage being scarce, and up to 40s. per ton freight having been paid. For autumn sailing, up to 8s. 7½d. per cwt. has been paid for ordinary quality. Spot prices have been advanced to 8s. 3d. per cwt. for ordinary, and 8s. 6d. for refined quality.

LONDON, *Aug.* 3.

**Tar Products.**—The high price now being asked for fuel is seriously felt by distillers, many of whom, however, have now returned to burning creosote and other oils in lieu of coal and coke. There is much to commend this course, as at present prices not only is it a more convenient fuel, but it is distinctly the cheapest. This new outlet for creosote and oils will undoubtedly reflect itself on the market value of them. Carbolic acid is still firm, and in good inquiry. Benzols are steady, with an excellent business being booked for early forward delivery, and are likely to maintain their improved position. There is still a good business to be done in naphthalene in its various forms. The quality turned out by English makers has greatly improved of late, and the business is assuming very large proportions. Naphthas are realizing fair prices, always excepting crude naphtha, which is not easy of sale. Solvent naphtha is, as is usual at this time of the year, strong; but the production of both it and other products at the moment is at its lowest ebb. More money is again being asked for coal; and this is likely to influence the price of pitch, which is marked stronger with important business reported for next season's delivery.

Prices may be taken as follows: Tar, 17s. to 26s. Pitch, east coast, 36s. 6d.; west coast, 32s. 6d. Benzol, 90's, 7½d. to 8¼d., according to position; special qualities for gas, 9½d.; and 50's, 10½d. Toluol, 1s. 2d. Solvent naphtha, 1s. 2d. Crude naphtha, 3½d. Heavy naphtha, 1s. 1d. Creosote, 2d. Heavy oils, 3d. Carbolic acid, 50's, 2s. 3d.; 60's, 2s. 9d. Naphthalene and salts, 45s. to 75s. Anthracene, "A," 4d.; "B," 3d.

**Sulphate of Ammonia.**—There is a decided shyness on the part of buyers, and during the week the market has been undoubtedly flat. The dulness, however, may be only temporary, as there is very little business doing, and makers have no stocks. There is not likely to be much improvement in values until the holiday season is over. The average price to-day in all positions may be taken at about £11 2s. 6d. per ton, less 3¼ per cent. The improved position of nitrate of soda may help sulphate.

## COAL TRADE REPORTS.

**From Our Own Correspondents.**

**Lancashire Coal Trade.**—The further advance on house fire coals with the 1st of the present month has come rather as a surprise, but is not more than might have been anticipated considering the excessive pressure of demand all through July for every description of fuel suitable for house-fire purposes, and which was obviously not intended to meet current requirements, but in reality to get in extra supplies prior to the upward move of 1s. 8d. per ton, which Lancashire collieries had agreed among themselves to put in force on the 1st of September. The advance which has now been declared—a month earlier than was originally intended—has put some check upon the rush of buying; but local collieries report that they are still booking orders freely at the advanced rates, all unexecuted orders having been cancelled unless they are renewed at the higher prices. This advance scarcely does more than put house-fire qualities on a level with the upward move which had previously taken place in other descriptions of round coal; and it is hardly likely that prices for gas making coals, or steam and forge qualities, will mark any further appreciable rise. In fact, the tendency of the market is rather towards lessening firmness than otherwise for some descriptions of steam coal; and contracts have been placed during the past week at lower prices than collieries were prepared to entertain a month or so back. This no doubt is due to the less favourable outlook of the large coal-using trades generally, in which here and there undoubted signs of slackening off are already becoming apparent. The extra demand for screened coal during the past month has, of course, thrown increased quantities of slack on the market; and engine fuel continues generally plentiful, with prices barely maintained at late rates. Engine fuel, in fact, in the open market is purchasable at decidedly easier prices; and it would seem more than probable that Lancashire collieries which are still holding to their full basis rates will have to give way to meet the keen competition which is coming forward from surrounding mining districts. With the exception of the advance on house coal and nuts, there is no other actually quotable change in prices, which at the pit mouth may now be given as follows: Best Wigan Arley about 16s. 6d. to 17s. per ton, Pemberton four-feet and seconds Arley 15s. to 15s. 6d., common house coal 14s. to 14s. 6d., steam and forge coal 12s. 6d. to 13s., and engine fuel from 10s. 6d. for common to 11s. and 11s. 6d. for best sorts. The shipping trade is not nearly so pressing as it has been; and although the Association basis rates for screened steam coal delivered at Mersey ports remain at 15s. 3d. per ton, business is becoming very difficult to do at this figure, which is being cut under by some outside sellers.

**Northern Coal Trade.**—There has been more activity in the coal trade in the past few days; and prices have been generally firmer through the fuller demand for shipment. Steamers have been rather more plentiful; and the tendency is towards increased activity for the next week or two at least. In the steam coal trade, this is perhaps the most noticeable—best Northumbrian steam coals being now 18s. 6d. per ton f.o.b. for early delivery; but some of the pits have contracted for the great bulk of their production, and thus are able to ask even higher prices. Steam smalls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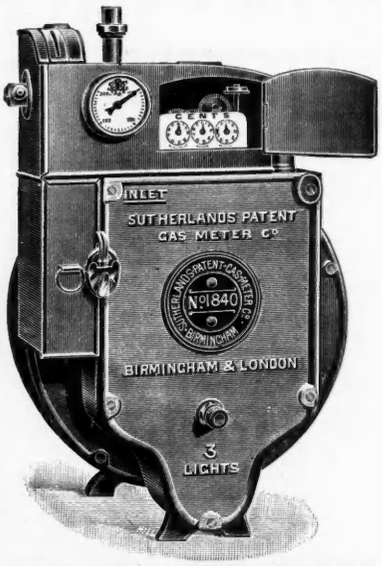


THE SUTHERLAND GAS-METER COMPANY
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are steadier at from 11s. 9d. to 12s. 3d. per ton. In the gas coal trade, there is a little fuller consumption; and it is evident that the stocks are not heavy with the great companies, so it is probable that increased requirements will soon show themselves. The output, however, is fairly full; and it is supposed by some of the producers that there may be difficulty in keeping up full supplies a little later in the year. The price of gas coals is firmer now that the export is larger—about 16s. 3d. to 17s. per ton f.o.b. being the quotation for best Durham. Sales of occasional cargoes are slight at present; and a few contracts at low rates still linger. In coke, the market is firm all round; 34s. 6d. being the medium price for best foundry kinds f.o.b. for export. In gas coke manufacture, there is little alteration this week; and there is still some irregularity in the quotations.

**Scotch Coal Trade.**—The demand for all classes of coal continues good; and prices are still maintained. House coal is being advanced 1s. per ton, retail prices. The Conciliation Board met in Glasgow on Tuesday, and it was reported that the men had agreed to the masters' terms, which were: "(1) That the Conciliation Board be continued for one year from 1st August. (2) Miners' and underground workers' wages shall not fall below a point 37½ per cent. over the 1888 basis, nor be advanced above 100 per cent. over the 1888 basis for one year from 1st August. (3) Miners' and underground workers' wages shall be advanced an additional 25 per cent. on the 1888 basis on 1st August, the wages so fixed to continue in force until the 1st of February, 1901." Harmony in the coal trade is thus assured for another twelve months. Under this agreement, the maximum wage will be 8s., and the minimum 5s. 6d. per day. The prices quoted are: Main, 14s. 6d. to 14s. 9d. per ton, f.o.b. Glasgow, ell 16s. to 17s., and splint 16s. 6d. to 17s. The shipments for the week amounted to 168,989 tons—an increase upon the previous week of 29,439 tons, and upon the corresponding week of last year of 1604 tons. For the year to date, the total shipments have been 5,980,647 tons—an increase upon the corresponding period of last year of 1,054,272 tons.

**Final Meeting of the Frith Hill and Godalming Water Company.**—As arrangements have been completed for the transfer of the undertaking of the above-named Company to the Corporation of Godalming, the final meeting of the Company took place a few days ago, when the statement of accounts for the five quarters ending March 31 last, prior to the winding up of the concern, was presented. The profit was £2283; and it was decided to pay a dividend of 6½ per cent., which would leave £107 or £108 for the Directors. The Chairman (Mr. T. E. Page) pointed out that the net income of the Company for the past 15 months was £2400, thirty years' purchase of which would come to £72,000; and the amount paid by the Corporation was £72,185. Out of the purchase-money £500 had been voted to the Directors; and it had been decided to take a portion of this amount, and purchase a testimonial which could be handed to Mrs. Collier, the wife of their late and much-esteemed Vice-Chairman. A useful dressing-bag, fitted with silver mounts, and a silver tea and coffee service, had been purchased, and an appropriate inscription placed thereon.

**Maxim Carburetters at the Leeds Gas-Works.**—The result of the trial of these carburetters at the Sheepscar works of the Leeds Corporation has been so satisfactory, that they are to be installed at the other stations, at a cost of £1000.

**Stockport Gas and Electricity Supply.**—At the meeting of the Stockport Town Council last Wednesday, the Mayor, as Chairman of the Gas and Electricity Committee, proposed the adoption of the report of the Committee, which stated that the net profit on the past year's working of the Gas Department had been £8976, and on the Electricity Department £118 for the first sixteen months. He expressed the hope that this would be considered a satisfactory result. The Committee had resolved—"That the price of electric current be modified by adopting the principle of differential charging—such charge to be at the rate of 5d. per unit for the first hour's daily capacity and 2½d. per unit for all current used in excess." This was agreed to.

**New Gas-Meter Testing Office for the London County Council at Newington.**—At the meeting of the London County Council last Tuesday, the Public Control Committee brought up a report stating that the site for the proposed new gas-meter testing office at Newington having been acquired, plans had been prepared for a suitable building, the cost of erecting which was estimated by the Architect at £8550, and a provision of £10,000 had been included in the Council's Money Bill for the purpose. The Committee expressed their intention of carrying out the work without the intervention of a contractor, and of entrusting it to the Works Department, in the event of the Manager being satisfied with the Architect's estimate. This having been forwarded to the Finance Committee of the Council and approved by them, the work was sanctioned.

**Anglo-Belgian Welsbach Incandescent Gas-Light Company, Limited.**—At the second ordinary general meeting of this Company, held last Tuesday, the Chairman (Mr. G. E. N. Ryan) stated that the net profit for the 16 months of the Company's existence was £8800, of which £7100 only (for the past year) was divisible. The dividend upon the preference shares absorbed £4700; and, after the payment of 3 per cent. upon the ordinary shares, there remained a balance of between £500 and £600. The Company had been obliged to reduce the prices of burners from 14 frs. to 8 frs., and mantles from 2½ frs. to 1½ frs. They had sold in the first twelve months of working—from May 1, 1899, to April 31, 1900—178,250 mantles and 49,652 burners. Such a record as this ought to enable them to place the greatest reliance in their Managing-Director (M. Sepulchre), and justify them in hoping for substantial dividends in the future. He moved the adoption of the report. Mr. A. Marshall Jay, in seconding the motion, said he had no doubt the Company would take a first-class and prominent position in Belgium at a very early date. The mantles were being used in the King's Palace, and orders were being given daily by the Government, in addition to railway companies and other large organizations. Since the prices had been reduced, the sales had doubled, and were increasing daily. The report was adopted without discussion. Dividends at the rate of 7 per cent. per annum on the preference shares, and of 3 per cent. per annum on the ordinary shares, were then declared; and the proceedings closed with the usual votes of thanks.


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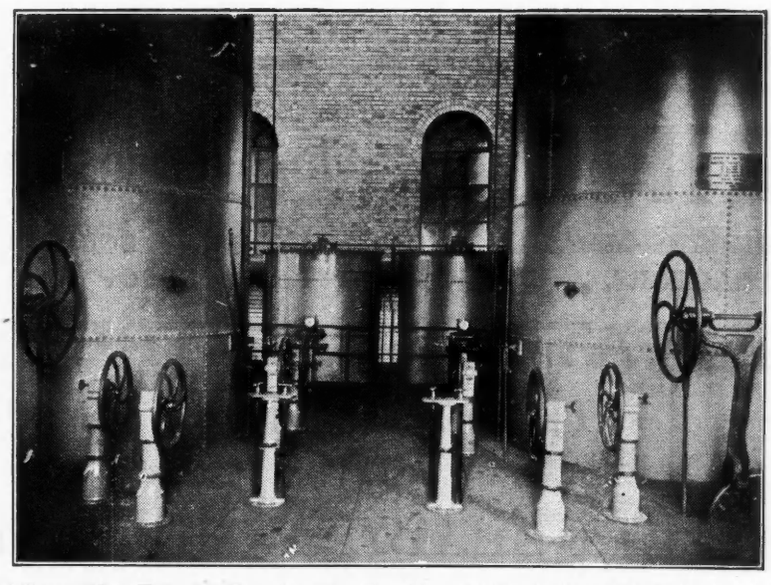

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**Opening of the Wetherby Water-Works.**—Last Wednesday the promoters and shareholders of the Wetherby District Water Company and the members of the various public bodies in the rural district of Wetherby were invited to take part in the official opening of the pumping station of the Company and a temporary reservoir on a site near Brandon Hall, Bardsey, capable of holding two million gallons. The idea out of which the present Company has arisen was first mooted some nine years ago; but it was not until April of last year that boring was commenced, and water was struck in the following June. The source of supply is a well in the lower millstone grit; and two separate sources have been tapped, from which it is expected a daily average of three-quarters of a million gallons will be pumped. The reservoir is situated about seven miles from Wetherby; and the water will be conveyed to the town in cast-iron mains. In the course of the subsequent proceedings, the Chairman (Mr. Richard Barnes) complimented Mr. T. H. Rhodes, one of the Company's Engineers, upon his success in indicating a site from which a supply of water might be obtained. The first source tapped yielded half-a-million gallons every twenty-four hours; but as this was felt to be insufficient, another bore-hole was sunk close by, from which they were fortunate enough to obtain a fresh supply—sufficiently shown by the fact that it rose 50 feet higher than the old supply. They now had enough water to supply within 6000 of the entire population of the district covered by their powers; and they had the right to bore for two more wells and erect two more pumping-stations.

**United States Coal in Europe.**—The British Consul at Philadelphia mentions, in his last report, as "one of the most interesting features of the present great commercial activity in the United States," the extraordinary demand in Europe for American coal, in consequence of the threatened coal famine on the Continent. For the first time in their history, he says, the United States have become exporters of coal to Europe. Within a short time inquiries for placing orders from London and Germany have been made in Philadelphia. In Germany the demand has arisen through the exceptional activity of German manufacturing establishments, supplemented by the exertions of the Coal Trust, which has forced the price of coal much inferior to American up to the exorbitant figure of about £1 19s. 8d. per ton to all who are not fortunate enough to have contracts placed earlier. Italy, in particular, is using American coal largely; a great number of shipments having been made there lately in consequence of the high prices of British coal. The American coal is said to be placed in the market of Genoa from 6s. to 8s. per ton cheaper than British coal. Our Consul at Trieste also mentions in his report for the past year that, in consequence of the great rise in the prices of English coal, three steamers laden with American coal reached Trieste; this being the first occasion on which American coal has been imported to Austria in competition with English coal. The Consul says he is told that coal from the Pocahontas mines, which is reported to be equal to the best Welsh steam coal, can be imported at 5s. under the price of Welsh coal. The freight charged on three cargoes of 10,000 tons that were under the Austrian flag was 20s. per ton. The imports of British coal at Trieste last year amounted, according to this report, to upwards of 166,000 tons.

**Wolverhampton Corporation Water Supply.**—The annual report of the Water Committee of the Wolverhampton Corporation shows that the profit for last year, after paying interest on capital and providing for the sinking fund, in respect of the portion of the water debt represented by the Wolverhampton Corporation stock, amounts to £6163, of which £4000 has been transferred to the credit of the improvement fund. The income for the year reached £30,080, an increase on that of the previous year, which was £28,877, while the expenditure amounted to £23,916.

**The Waste of Water in Leeds.**—The Water Committee of the Leeds Corporation held a special meeting last Tuesday, under the presidency of Mr. Denison (the Deputy-Chairman), to consider the position of the city as regards its water supply. The ascertained waste of water is very serious; and, notwithstanding the urgent appeal made to the public by the Committee, the consumption is daily increasing. It was felt by the Committee that the means at present employed for detecting waste are not sufficient to cope with the situation. A report from a Company who make a speciality of meters for the detection of waste was considered, and a Sub-Committee were appointed to deal with their offer. They were instructed to visit other towns where the Company's system has been adopted, and, if satisfied with the results, they have power to arrange for an installation in one district of the city as an experiment. This work will probably occupy from four to six weeks. The present consumption per head of the population for domestic supply is nearly 32 gallons per day; but it is hoped to reduce this by almost one-third. The Engineer (Mr. Hewson) was instructed to put down a number of meters to ascertain the true domestic consumption of water by typical households; and also, in future, in all cases of ascertained waste for trade purposes, to at once place a meter to check the quantity used.

**Gas v. Coal in Manchester.**—In a recent number of the "Manchester Guardian," Mr. E. Sykes offered a few comments on the review of Mr. Jones's pamphlet on the "Air of Rooms," which was noticed in the "JOURNAL" last week (p. 273). Mr. Sykes believes the alarm caused by the publication of the pamphlet is due simply to a re-statement of the case with no suggestion beyond that of the abandonment of the gas-stove. He says: "I am of opinion that the difficulties in connection with products of combustion emanating from the gas-stove are surmountable. The entire fault lies in inefficient ventilation or draught. I also think that the humidity could be made to approach normal conditions. If the research of Mr. Jones had continued on these lines, it would have possessed considerable utility. A modified gas-stove might have been the result; the pecuniary and hygienic aspects of the householder's situation would have been improved; and the outside atmosphere would be purified to a large extent through diminution of smoke, which at the present time is a very large factor in atmospheric contamination." Mr. Sykes gives the following figures as embodying his own experience in regard to the comparative economy of coal and gas in Manchester: 1¼ cwt. of coal per week, at 1s. per cwt., 1s. 3d.; cost of firewood, 3d.—total 1s. 6d. Cost of gas, including stove hire, 8·27d.; showing a saving of 9·73d., with "greater cleanliness, less labour, and one chimney less turning its smoke into the atmosphere."


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**Colne Valley Water Company.**—At the meeting of this Company at Bushey, last Wednesday, the Directors reported that the total amount of capital expenditure in the six months ending June 30 was £5933, the principal part of which was in connection with the new pumping main and other extensions of pipes. The new service reservoir has been completed and is in general use, and all other new works are progressing satisfactorily. The revenue account showed a profit of £7294; and the balance of the dividend and interest account, after paying the debenture stock and preference share interest and transferring £500 to reserve, was £6361. The Directors recommended a dividend for the half year at the rate of 6 per cent. per annum, less income-tax, which would leave £1185 to carry forward. The dividend for the corresponding half of 1899 was at the rate of 5½ per cent., and the amount carried forward was £630.

**Leicester Corporation Gas Supply.**—The Chairman of the Leicester Corporation Gas and Electric Lighting Committee (Alderman Lennard) furnished some interesting particulars in regard to the progress of the gas undertaking in the six months ending June 30, when moving the adoption of the Committee's report at the meeting of the Town Council last Tuesday. He stated that the quantity of gas made was 860,299,000 cubic feet, as compared with 752,850,000 cubic feet in the first half of 1899; being an increase at the rate of 14·27 per cent.—the largest the Corporation had had. There had been a greater consumption of gas for culinary purposes; the number of consumers being 42,354, as compared with 38,000. Of the additional number, 4221 employed prepayment meters. There were no less than 6737 more cooking-stoves fixed in the entire year. The use of gas for motive power was also on the increase, 76 additional engines being in operation in the town.

**Guiseley Water Charges: Defiant Attitude of Consumers.**—Under this heading, the "Bradford Observer" of last Friday said: The Guiseley Water-Works Company are experiencing considerable difficulty in enforcing the increased scale of charges which they put into operation as and from the 1st of April last. A number of the consumers absolutely refuse to pay these increased charges, which in many instances are double what has hitherto been paid; and having no Act of Parliament giving them power to sue for the debts due to them, the Company have resorted to cutting off the supply of those who decline to pay. Several disconnections have been effected; and in one or two instances some lively proceedings have been witnessed—the consumer defying the Company to go on to his private ground for the purpose of severing his service-pipe from the mains. Yesterday there was another exciting scene of this description in Springfield, in connection with an attempt on the part of the Water Company to cut off the supply of a non-paying customer. On the Company's workmen commencing to excavate down to the pipes, they were deluged with water which the consumer poured on to them by means of a hose pipe; and it was not until the supply for the whole of that particular locality was turned off that the men were able to continue their operations. No sooner, however, had they reached the pipes, than a large crowd gathered, whose sympathies were evidently with the consumer, and filled up the hole again, and the Company were powerless to effect their purpose. They, therefore, withdrew their men; and the next move is awaited with considerable interest.

**Coalowners and Gas Companies.**—The following letter from "A North Country Coalowner" appeared in "The Times" last Saturday: "Much has been said about the alleged unreasonable demands made upon the London Gas Companies by coalowners in the North of England. For the information of your readers, I may say that I have had a contract with both the South Metropolitan and the Gaslight and Coke Company for many years. Curiosity led me to refer back for ten years in order to ascertain what the two Companies referred to have been in the habit of paying for their coal. From March and July, 1888, to July, 1901 (which you will see includes the present high prices the Gas Companies are paying, and up to the middle of next year), I find that the actual price realized on the average during that time is 6s. 6d. per ton at the pit, which equals about 11s. 6d. delivered in London. I think this is a fact the public ought to know, as there are many collieries in the North which cannot produce the coal at a loss. Were it not for booms such as the present, many collieries would have to be closed; and this, ultimately, would neither be to the interest of the coal consumer, nor of those who produce it, and it would tend to make prices permanently higher. The gas-consuming public of London will, I think, from the figures I have quoted, admit that the Gas Companies, in being asked to pay the present market price, are not being unreasonably dealt with, when the low prices of past years are taken into consideration. I may say that the prices paid during the above period by the Gaslight and Coke Company and the South Metropolitan are practically the same—being within ¼d. per ton of each other. The quantity of coal supplied by my firm during the same period was considerably over 2,000,000 tons."

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Messrs. Biggs, Wall, and Co. have received orders for their "Rapid" Charging Machines from the Sligo Gas Company and the Enniskillen Gas Company.

It has been resolved to grant a weekly pension to Mr. G. W. Fox, for the past 35 years in charge of the Diss (Norfolk) Gas-Works, but now incapacitated by illness.

In the estimates of the London County Council for the year ending March 31, 1901, a sum of £4250 is put down for parliamentary and other expenses in connection with water supply.

At the Bewdley Town Council meeting yesterday week, it was reported that the Local Government Board required further tests before sanctioning a loan of £12,000 for the purpose of obtaining a new water supply for the borough.

As the result of an interview between the Directors of the Newcastle and Gateshead Gas Company and the representatives of the Bricklayers' Society, the wages of the bricklayers employed at the works of the former have been advanced to 11d. per hour from the 15th of June last.

At the Colne Town Council's monthly meeting last Wednesday, the Town Clerk reported that permission had been received from the Local Government Board to borrow (among other sums) £10,000 for gas works extensions and laying down new mains to different parts of the town.

We have received from Messrs. Sawer and Purves, of the Nelson Meter-Works, Manchester, their new illustrated catalogue and price list. It contains illustrations and descriptions of their wet and dry gas-meters, the "Positive" prepayment meter (detachable mechanism), pressure-gauges, street-lamps, main-taps, Nasmith's steam-traps, &c. It is very tastefully printed, in chocolate and black, on art paper, with an exceedingly effective frontispiece giving a general view of the works and of the principal shops. The book is neatly bound and gilt lettered, and is well worthy of a place on the gas manager's table.

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**NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.**

**Orders for Alterations in, or Stoppages of, PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAY.**


GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale than all other Oxides combined. Purity and uniformity of quality guaranteed.

JOHN WM. O'NEILL, Managing Director,
160, 161, & 162, PALMERSTON BUILDINGS,
OLD BROAD STREET,
LONDON, E.C.

ANDREW STEPHENSON, AGENT. All communications re Oxide to the Company as above.

WINKELMANN'S

"VOLCANIC" FIRE CEMENT.

Resists 4500° Fahr. Best for use in GAS-WORKS.

ANDREW STEPHENSON,
182, Palmerston Buildings,
Old Broad Street,
"Volcanism, London." London, E.C.

BROTHERTON & CO.

Offices: Commercial Buildings, LEEDS. Correspondence invited.

PATENTS FOR INVENTIONS.

Messrs. J. C. CHAPMAN & CO., Chartered Patent Agents, ADVISE ON ALL MATTERS CONNECTED WITH ABOVE.

Information and Handbook on application.
70, CHANCERY LANE, LONDON, W.C.

HYDRATED OXIDE OF IRON.

PREPARED from Pure Iron.

Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Lent on Hire.
Can be Exchanged for Spent Oxide.

READ, HOLLIDAY AND SONS, LTD., HUDDERSFIELD

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM; and 45 & 47, Westminster Bridge Road, LONDON, S.E.

First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.

Telegraphic Addresses:
"Braddock, Oldham." "Metrique, London."

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Limited, Chemical Works, Leeds, specially produce this ACID from SULPHUR, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Waggons or Carboys. Highest references and all particulars supplied on application.

TO GAS AND WATER OFFICIALS.

HIGH-CLASS Cycles at reasonable and low Prices. Guaranteed for Twelve Months. Sent on approval. For Cash or Gradual Payment System. Send for Catalogue, Post Free.
MELROSE CYCLE COMPANY, COVENTRY.

AMMONIACAL LIQUOR wanted.

BROTHERTON AND CO., Ammonia Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

CANNEL, COAL, ETC.

JOHN ROMANS & SON, EDINBURGH, Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS and WATER WORKS.

Prices, &c., will be forwarded on application.
No. 30, ST. ANDREW SQUARE, EDINBURGH, } SCOTLAND.
NEWTON GRANGE, NEWBATTLE, DALKEITH, }

SADLER & CO., Ltd., Middlesbrough, Tar Distillers and Tar Colour Manufacturers. BENZOL specially prepared for Gas Enrichment free from Sulphur. Pure Hydrated OXIDE OF IRON for Purifying Gas either for Sale or Lent on Hire. Always Buyers of GAS TAR and AMMONIACAL LIQUOR.

GAS PURIFICATION.

OXIDE OF IRON BOG ORE.

BALE & CO.'S Oxide of uniform quality.

SPECIAL FIRE CEMENT, OXIDE PAINTS, OILS, SULPHURIC ACID, &c.
120 and 121, NEWGATE STREET, LONDON, E.C.
Telegrams: "BOGORE, LONDON."

ENRICH your Gas with cheap Benzol

Specially prepared, free from sulphur. At to-day's Price of Benzol, ILLUMINATING POWER costs less than ONE-THIRD OF A PENNY PER CANDLE.
Apply to SADLER AND CO., MIDDLESBROUGH.

PRACTICAL RETORT SETTERS.

GEORGE NUTTALL & CO., 32, Havelock Road, Saltley, Birmingham.

Regenerator or other Furnaces erected to Engineers' own Designs. Best Work Guaranteed. Please write for Estimates.

NEW GAS PLANT CEMENT.

JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.

For all Joints in connection with Oil Gas Plant and Sulphate Plant.
For all Gas Joints.
For all Tar Joints.
For all Ammonia Joints.

PORTER & CO., Gowts Bridge Works

LINCOLN, Engineers, Ironfounders, and Contractors for the erection of Gas-Works for Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings at home and abroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.

Telegraphic Address: "PORTER, LINCOLN."
[For Illustrated Advertisement, see p. 382.]

**GAS TAR wanted.**
BROTHERTON AND CO., Tar Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

**SULPHATE OF AMMONIA SATURATORS.**

**JOSEPH TAYLOR & CO., Chemical** Plumbers, &c., and Makers of every description of Solid Plate Lead and Timber Cased Saturators, &c., CENTRAL PLUMBING WORKS, TOWN HALL SQUARE, BOLTON. Special attention to Repairs.
Before placing Orders, please write for Estimate.
Telegraphic Address: "SATURATORS, BOLTON."

**SULPHURIC ACID for Sale.**
BROTHERTON AND CO., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

**TRAVELLER, with old and extensive** connection among Gas Companies, is open to REPRESENT a Firm of Fire-Clay Retort and Brick Manufacturers and General Gas Plant Contractors.
Address No. 3521, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**WANTED, experienced Retort Setters.**
Apply to R. DEMPSTER AND SONS, LTD., ELLAND.

**WANTED, a man for examining and** relaying Mains and Services.
Apply, with Testimonials, to WHITEHAVEN UNITED GAS COMPANY, LIMITED.

**WANTED, a skilled Mechanic to** Superintend the erection of the Ironwork and Coal-Handling Plant for 25 Beds of Inclined Retorts in Australia.
Apply, by letter, to No. 3536, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**WANTED, Two experienced Engineers** to take the leading and superintending positions in the erection of the Ironwork and Conveying and Elevating Plant for 40 Beds of Inclined Retorts in Germany.
Apply, by letter, to No. 3537, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**WANTED, a thoroughly reliable and** steady Man as LEADING STOKER. Must be a good Shovel Charger, and used to Engine and Exhauster.
For further Particulars apply to H. C. SHEPHERD, Manager and Secretary, Gas-Works, Old Swindon, WILTS.

**TWO Leading Stokers required in** Country Works. Wages average 35s. per week. Shovel charging.
Also ENGINE and PUMP HAND. Wages average 29s. per week.
Fully competent men only.
Address: No. 3533, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**THE Bombay Gas Company, Limited,** require an ASSISTANT MANAGER to proceed to Bombay. Engagement five years. Age from 25 to 30.
Applicants must be unmarried, and be practically acquainted with Gas Engineering, Manufacture, and Accounts, as well as qualified to undertake any duties (indoor and outdoor) which may be allotted by the Manager.
Salary £300 sterling per annum. Horse allowance, House, Fuel, and Gas free, and first-class passage out and home.
Applications, by letter, stating Age, and accompanied by *copies* of Testimonials, to be addressed to the SECRETARY OF THE COMPANY, 6, Drapers' Gardens, LONDON, E.C., and sent in on or before the 22nd of August.

**SOUTH SHIELDS GAS COMPANY.**

**WANTED, a thoroughly competent Gas** ENGINEER to take the management of the Gas-Works. He must be well versed in the modern methods of Manufacture and Distribution of Gas and the Production of Sulphate of Ammonia; also capable of designing and carrying out extensions of Works and Plant.
There are two Stations, with a Superintendent at each.
The total annual make is about 540 millions.
Age not to exceed 40 years.
Applications, marked "Gas Engineer," stating Age, Experience, Qualifications, and Salary required, and enclosing *copies* of recent Testimonials, to be sent to the undersigned on or before the 9th day of August, 1900.
By order of the Board,
J. H. PENNEY,
Secretary.
Gas Offices, Chapter Row,
South Shields, July 27, 1900.

**FARNHAM GAS COMPANY, LIMITED.**

**WANTED, a competent Gas Manager,** SECRETARY, COLLECTOR, and METER TAKER. Present annual make, 26,000,000 at works, under competent Foreman. Salary £150 per annum, exclusive of such amount as will have to be paid for a bond in an approved Society.
Applications, stating Age and previous Experience, to be made in Candidate's own handwriting, accompanied by not more than three *copies* of Testimonials of recent date (which will not be returned), and addressed to the Chairman, G. McDonald, Esq., No. 104, West Street, Farnham, Surrey, on or before Monday, the 13th of August, 1900, at Twelve o'clock noon.
W. WELLS,
Secretary.
Farnham, Surrey,
July 26, 1900.
*** This advertisement should have appeared in the "JOURNAL" for July 31, but was accidentally omitted.

## NORTH OF IRELAND ASSOCIATION of GAS MANAGERS.

THE
## ANNUAL MEETING
**Of the Association**
WILL BE HELD IN THE
## TOWN HALL, SLIGO,
**ON TUESDAY, AUG. 14, 1900.**

The Chair to be taken at 9 a.m. by the President, Mr. C. B. TULLY.

Business: Payment of Subscriptions; Report of Committee; President's Address; Motion to Change the Name of the Association (Proposer: S. B. Langlands. Seconder: F. Eustace); Admission of New Members; Election of Office Bearers.
An opportunity will be given of inspecting the following apparatus at work, and they will be fully described by the President: 1. Professor Lewes's Methane Hydrogen Water Gas Plant. 2. Apparatus for Enriching Gas with Benzol or other Light Hydrocarbons. 3. Biggs, Wall, & Co.'s "Rapid" Charging Machine.
Refreshments will be provided at the Town Hall during the Meeting.
Arrangements have been made for a Drive round Lough Gill in the Afternoon, with Dinner at Dromahair, at 4 p.m. Tickets for Drive and Dinner, 5s. each.
JAMES WHIMSTER,
Hon. Secretary.
Gas-Works, Armagh,
Aug. 1, 1900.

**DRAUGHTSMAN wanted for Con**tractor's Office. Must have experience in Designing and Detailing Gas Apparatus.
Apply, stating Salary required, Experience, &c., to No. 3534, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**TRAVELLER, INCANDESCENT GAS LIGHTING.**

**WANTED, immediately, experienced** TRAVELLER for Yorkshire and District.
Apply, with *copies* of Testimonials and full Particulars, to No. 3535, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**WANTED, by the Irthlingborough Gas** and Coke Company, Limited, a thoroughly qualified MANAGER and SECRETARY. Annual make of Gas about 15 Millions.
Applications, with *copies* of recent Testimonials, stating Age, Experience, and Salary required, to be sent to Mr. JOHN T. LEWIS, Gas-Works, WELLINGBOROUGH.

**A GAS Company require the services** of a smart intelligent young Man as SHOP ATTENDANT, to also take charge of a Gas and Electricity Fittings Department. A good knowledge of Electric Wiring indispensable.
Apply, stating full Particulars as to Qualifications, Experience, Age, and Salary required, to No. 3531, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**LOCOMOTIVE Crane and Grab for Sale.** Nearly new. Most economical for loading Coke or Coal. Will do the work of a dozen men.
Apply, Box 56, Post Office, MIDDLESBROUGH.

**FOR SALE—Engine and Exhauster,** 20,000 cubic feet per hour, in good condition, ready for immediate delivery.
BENJAMIN BARK.
Gas-Works, Godalming.

**ENGINES and Exhausters combined** "Waller," to pass 30,000 cubic feet per hour. DITTO to pass 7000 feet per hour, overhauled and complete. Cheap to clear. Also BOILERS.
J. FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

**GASHOLDER, 50 ft. by 20 ft., with Six** Columns, 15 inches diameter, Wrought Lattice Girders, &c., complete and perfect. About Fourteen Years old.
Price, erected, on application to J. FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

**STOURBRIDGE Retorts for Sale, lying** at a Gas-Works in Kent. New, first quality. 22 in. by 16 in. D's—viz., 30 Mouthpieces 6 ft. 9 in. open ends; Six 9 ft. 10 in. Mouthpieces open ends; and Ten Middles, 6 ft. 6 in. Manufacturer will make up quantity and lengths required. Offers solicited.
Apply, by letter, to No. 3530, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**GAS PLANT for Sale—I can always offer** NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

**SECOND-HAND PHOTOMETERS.**

**MESSRS. Alex. Wright & Co., Ltd.,** have several second-hand EVANS & LETHEBY PHOTOMETERS, complete with Instruments in thorough working order and good condition, which they can offer at greatly reduced Prices.
Write ALEX. WRIGHT AND CO., LIMITED, Precision Works, 81, Page Street, WESTMINSTER, S.W.

**CONDENSERS, Washer-Scrubbers,** "Cutler" patent CONDENSERS (14) 6 in. to 12 in. PIPE CONDENSERS, Patent WASHERS by "Livesey," "Holmes," and "Cockey," EXHAUSTERS up to 60,000 Cubic Feet per hour. ENGINES, BOILERS, &c. Several TOWER SCRUBBERS, PURIFIERS, METERS, GOVERNORS, PUMPS, TANKS, VALVES, &c.
J. FIRTH BLAKELEY AND CO., Gas Engineers, DEWSBURY.

**KIMBOLTON GAS, COAL, AND COKE COMPANY.**

**TENDERS are invited for the purchase** of the WORKS of the Kimbolton Gas, Coal, and Coke Company now in operation.
Sealed Tenders to be forwarded to the Secretary on or before the 1st day of September next.
GEO. B. DAY,
Secretary.
Kimbolton, St. Neots,
July 26, 1900.

**BOROUGH OF ABERAVON.**

**THE Gas Committee are prepared to** receive TENDERS for 1700 Tons of GAS COAL and 300 Tons of CANNEL to be delivered as required up to May 1, 1901.
Sealed Tenders to be sent to me not later than Saturday, Aug. 11, 1900.
M. TENNANT,
Town Clerk.

**TENDERS FOR TAR.**

**THE Gas Committee of the Carnarvon** Corporation invite TENDERS for the purchase of the surplus TAR made at their Works during the Twelve Months ending the 31st of August, 1901.
The Tar will be loaded free into Contractor's Tank Trucks on Rail at the Gas-Works Siding, Carnarvon.
Payments: Net Cash Monthly.
Sealed Tenders, endorsed "Tender for Tar," and addressed to the Chairman of the Gas Committee, Guildhall, Carnarvon, to be delivered on or before Thursday, the 23rd inst.
The Committee do not bind themselves to accept the lowest or any Tender.
Any further Information may be had from the undersigned.
WILLIAM M. RUXTON,
Manager.
Gas Office, Carnarvon,
Aug. 3, 1900.

**CLACTON URBAN DISTRICT COUNCIL GAS-WORKS.**

CONTRACT No. 4.

**THE Gas and Water Committee of the** above Council are prepared to receive TENDERS for the Manufacture and Erection of CAST-IRON PURIFIERS 16 feet square by 5 feet deep, with Steel Covers, Lifting Apparatus, and Connections.
Copies of the Specification, Form of Tender, and Drawings may be obtained from the Engineer, Mr. Sydney Francis, Town Hall, Clacton-on-Sea, Essex, on payment of One Guinea, which will be returned on receipt of a *bonâ-fide* Tender.
Sealed Tenders, endorsed "Tender for Purifiers," to be delivered to the undersigned not later than Four p.m., on Monday, Aug. 20, 1900.
The Committee do not bind themselves to accept the lowest or any Tender.
GEO. T. LEWIS,
Clerk.
Town Hall Buildings, Clacton-on-Sea,
Essex, Aug. 2, 1900.

**CLACTON URBAN DISTRICT COUNCIL GAS-WORKS.**

CONTRACT No. 5.

**THE Gas and Water Committee of the** above Council are prepared to receive TENDERS for the Manufacture and Erection of a MECHANICAL SCRUBBER and TAR EXTRACTOR, together with connections, &c.
Copies of the Specification, Form of Tender, and Drawings may be obtained from the Engineer, Mr. Sydney Francis, Town Hall, Clacton-on-Sea, Essex, on payment of One Guinea, which will be returned on receipt of a *bonâ-fide* Tender.
Sealed Tenders, endorsed "Tender for Scrubber," to be delivered to the undersigned not later than Four p.m., on Monday, Aug. 20, 1900.
The Committee do not bind themselves to accept the lowest or any Tender.
GEO. T. LEWIS,
Clerk.
Town Hall Buildings, Clacton-on-Sea,
Essex, Aug. 2, 1900.

**CLACTON URBAN DISTRICT COUNCIL GAS-WORKS.**

CONTRACT No. 6.

**THE Gas and Water Committee of the** above Council are prepared to receive TENDERS for the Manufacture and Erection of a complete SULPHATE of AMMONIA PLANT on the Continuous principle.
Copies of the Specification, Form of Tender, and Drawings may be obtained from the Engineer, Mr. Sydney Francis, Town Hall, Clacton-on-Sea, Essex, on payment of One Guinea, which will be returned on receipt of a *bonâ-fide* Tender.
Sealed Tenders, endorsed "Tender for Sulphate Plant," to be delivered to the undersigned not later than Four p.m., on Monday, Aug. 20, 1900.
The Committee do not bind themselves to accept the lowest or any Tender.
GEO. T. LEWIS,
Clerk.
Town Hall Buildings, Clacton-on-Sea,
Essex, Aug. 2, 1900.

# NOW READY.

# ACETYLENE

## *A Handbook for the Student and Manufacturer.*

### By VIVIAN B. LEWES, F.I.C., &c.,

PROFESSOR OF CHEMISTRY, ROYAL NAVAL COLLEGE, GREENWICH, CHIEF SUPERINTENDING GAS EXAMINER TO THE CORPORATION OF THE CITY OF LONDON, &c.

**ABOUT 1000 PAGES AND 228 ILLUSTRATIONS.**

**PRICE 32s. NET.**

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The History of Acetylene from its Discovery to the Introduction of Commercial Acetylene.

The Preparation of Acetylene.

Acetylene and its Properties.

The Chemical Reactions of Acetylene.

The Electric Furnace and its Application to the Manufacture of Calcium Carbide.

The Manufacture, Properties, and Impurities of Calcium Carbide.

The Generation of Acetylene.

The Impurities of Commercial Acetylene and the Processes Adopted for their Removal.

The Generation of Light and Power from Acetylene.

The Utilization of Diluted Acetylene.

The Analysis of Material for Carbide Manufacture, of Carbide, and of Acetylene.

Legal Enactments in force in various countries with regard to the use of Acetylene.

English Patents, Appendix of Useful Data, Index.

**ARCHIBALD CONSTABLE & CO., LIMITED,**

**2, WHITEHALL GARDENS, WESTMINSTER.**

**THE Directors of the Cuckfield Gas Company** invite TENDERS for the supply of best GAS COAL for the year ending the 1st day of August, 1901: the coal to be delivered at Haywards Heath Station in such quantities as shall be from time to time ordered. Estimated quantity required about 700 Tons.

Tenders to be sent in to me on or before the 11th day of August, 1900, endorsed "Tender for Coal."

EDWARD WAUGH,
Secretary.

Haywards Heath,
July 31, 1900.

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**LYTHAM URBAN DISTRICT COUNCIL.**

**TENDERS are invited for the construction** and erection of a PURIFYING HOUSE and PURIFIERS at the Gas-Works, Lytham.

The Specification and Drawings may be seen on application to the undersigned, and at the Offices of Messrs. Thomas Newbigging and Son, Engineers, 5, Norfolk Street, Manchester.

Copies of the Bill of Quantities may be obtained from the latter on payment of Two Guineas, which will be returned if a *bonâ-fide* Tender is received.

Tenders, endorsed "Purifying House, Contract No. 2," to be sent so as to reach me not later than noon on Tuesday, the 21st inst.

The lowest or any Tender not necessarily accepted.

CHAS. A. MYERS,
Clerk to the Council.

Lytham, Aug. 1, 1900.

---

**YORK UNITED GASLIGHT COMPANY.**

TO GASHOLDER MAKERS.

**THE Directors of this Company are prepared** to receive TENDERS for the construction and erection of a STEEL GASHOLDER TANK, 140 ft. diameter by 26 ft. 9 in. deep, including certain excavations and the concrete foundation; also of a TELESCOPIC GASHOLDER in Three Lifts, with Guide Framing and Inlet and Outlet Pipes.

The Specification and Drawings may be seen at the Gas Office, York, and at the Office of the Engineers, Messrs. Thomas Newbigging & Son, 5, Norfolk Street, Manchester.

Copies of the Bill of Quantities and Forms of Tender may be obtained from the latter on deposit of Five Guineas, which will be returned if a *bonâ-fide* Tender is received.

Sealed Tenders, endorsed "Tank and Holder, Contract No. 1," to be addressed so as to reach me not later than noon on Tuesday, Aug. 21, 1900.

The Directors do not bind themselves to accept the lowest or any Tender.

CHARLES SELLERS,
Secretary and Manager.

Gas Office, York,
Aug. 2, 1900.

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**HORNSEY GAS COMPANY.**

**NOTICE is Hereby Given, that the** ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at the Offices, No. 63, Chancery Lane, in the County of Middlesex, on Friday, the 17th day of August, 1900, at Half-past Three o'clock in the afternoon precisely, to receive the Report of the Directors and the Accounts for the Half Year ended the 30th of June last, to declare Dividends, and to transact the Ordinary Business of a General Meeting.

The TRANSFER BOOKS WILL BE CLOSED from the 3rd to the 17th of August, both days inclusive.

By order of the Board,
F. W. HAWES,
Acting Secretary.

Offices: 63, Chancery Lane,
London, W.C., July 31, 1900.

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**RIDDINGS DISTRICT GAS COMPANY.**

**NOTICE is Hereby Given, that the** ORDINARY HALF-YEARLY MEETING of the Shareholders of the above Company will be held at the Offices of the Company, No. 30, Gracechurch Street, in the City of London, on Friday, the 24th day of August, 1900, at Three o'clock in the Afternoon precisely, to receive the Report of the Directors and the Accounts for the Half Year ended the 30th day of June last, to declare a Dividend, and to transact the General Business of the Company.

The TRANSFER BOOKS WILL BE CLOSED from the 11th to the 24th of August, both inclusive.

By order of the Board,
ERNEST W. DREW,
Secretary.

Offices: 30, Gracechurch Street,
London, Aug. 3, 1900.

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**TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.**

**NOTICE is Hereby Given, that the** ANNUAL ORDINARY GENERAL MEETING of the Proprietors of this Company will be held at the Company's Offices, Willoughby Lane, Tottenham, on Saturday, the 25th day of August inst., at Three o'clock in the afternoon precisely, to receive the Report of the Directors and Statement of Accounts for the Half Year ended the 30th of June, 1900; to declare a Dividend for the same period, and for the election of Two Directors and an Auditor for the ensuing year; to consider the Notice of Motion given at the Meeting held on the 24th of February last—viz., "That at the Annual General Meeting to be held on the 25th of August next, it be resolved that the Half-Yearly Meetings of the Proprietors be held in the months of February and August, the day and hour to be fixed by the Directors;" and for the transaction of General Business.

The TRANSFER BOOKS will be closed for the Consolidated Stocks from the 10th to the 27th of August inst., both days inclusive.

By order of the Board,
JAMES RANDALL,
Secretary.

Offices of the Company:
Willoughby Lane, Tottenham,
Aug. 3, 1900.

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**COLNEY HATCH GAS COMPANY.**

**NOTICE is Hereby Given, that the** ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at the Company's Offices, New Southgate, on Thursday, the 23rd day of August inst., at Five o'clock in the Evening precisely, to receive the Report of the Directors and the Accounts of the Company for the Half Year ended the 30th of June, 1900, to declare Dividends, and for other purposes.

By order,
ERNEST L. BURTON,
Secretary.

Secretary's Offices: 5, Great Winchester Street,
London, E.C., Aug. 2, 1900.

---

**BROMLEY GAS CONSUMERS' COMPANY.**

**NOTICE is Hereby Given, that the** ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the Bell Hotel, Bromley, Kent, on Tuesday, the 14th day of August, at Six o'clock precisely, to receive the Report of the Directors, the Balance-Sheet certified by the Auditors, to declare a Dividend, and for General Purposes.

The TRANSFER BOOKS WILL BE CLOSED from the 30th of July to the 14th of August, 1900, both days inclusive.

By order of the Board,
HENRY W. AMOS,
Secretary.

Offices: At the Works,
Bromley, Kent, July 26, 1900.

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**BARNET DISTRICT GAS AND WATER COMPANY.**

**NOTICE is Hereby Given, that the** ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of the above Company will be held at the Albion Tavern, Aldersgate Street, in the City of London, on Friday, the 24th day of August, 1900, at Half-past Twelve o'clock in the Afternoon precisely, to receive the Report of the Directors and the Accounts for the Half Year ended the 30th day of June last, to declare a Dividend, and to transact the General Business of the Company.

The TRANSFER BOOKS WILL BE CLOSED from the 11th to the 24th of August, both inclusive.

By order of the Board,
ERNEST W. DREW,
Secretary.

Offices: 30, Gracechurch Street,
London, July 27, 1900.

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**PATENTS, DESIGNS, AND TRADE MARKS ACTS, 1883 TO 1888.**

**NOTICE is Hereby Given, that** Augustus Henry Grautoff, of 3, Jeffrey's Square, St. Mary Axe, London, has APPLIED FOR LEAVE TO AMEND THE SPECIFICATION OF LETTERS PATENT No. 20,740 of 1898, granted to William Phillips Thompson, for "Improvements in and in the Manufacture of Incandescent Mantles."

Particulars of the proposed Amendment were set forth in the "Illustrated Official Journal (Patents)" issued on the 25th of July, 1900.

Any person, or persons, may give Notice of Opposition to the Amendment (on Form G) at the Patent Office, No. 25, Southampton Buildings, London, W.C., within One Calendar Month from the date of the said "Journal."

C. N. DALTON,
Comptroller-General.

HASELTINE, LAKE, & Co.,
45, Southampton Buildings, London, W.C.,
Agents for the Applicant.

---

**SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.**

**MR. ALFRED RICHARDS** begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held PERIODICALLY, at the Mart, Tokenhouse Yard, E.C.

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| Yield of Gas per Ton. . | 10,500 | Cubic Feet. |
| Illuminating Power . . | 16·9 | Candles. |
| Coke . . . . . | 66·7 | Coke. |
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| Ash . . . . . | 2·04 | Ash. |

As per Analysis by
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| Yield of Gas per Ton . . . | 11,205 Cubic Feet. |
| Illuminating Power | 16 1/10 Stand. Sperm Candl. |
| Coke (of good & pure quality) | 13¾ Cwt. per Ton. |
| Sulphur . . . . . | A little over 1 per Cent. |
| Ash . . . . . | Under 1 per Cent. |
| Tar . . . . . | 163 lbs. (Avoir.) per Ton. |
| Ammoniacal Liquor | 103 lbs. (Avoir.) per Ton. |

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| Yield of Gas per Ton | 10,500 Cub. Ft. |
| Illuminating Power | 16·9 Candles. |
| Coke (of good quality) | 67·5 per Cent. |
| Sulphur | 0·58 „ |
| Ash | 2·73 „ |

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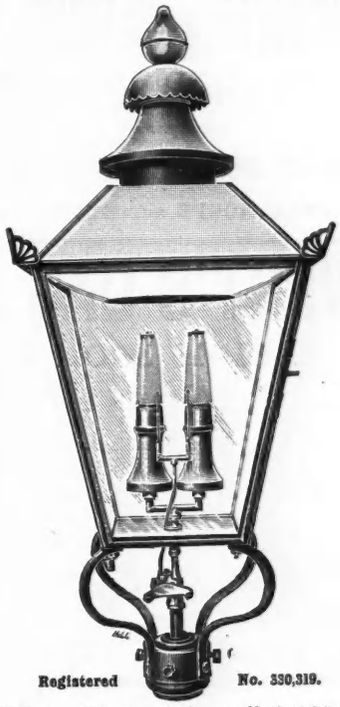

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| Yield of Gas per ton | 10,500 cub. ft. |
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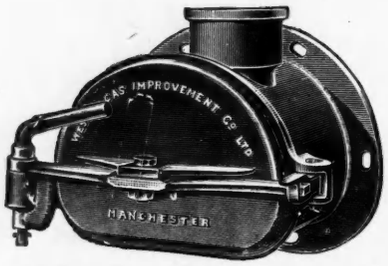


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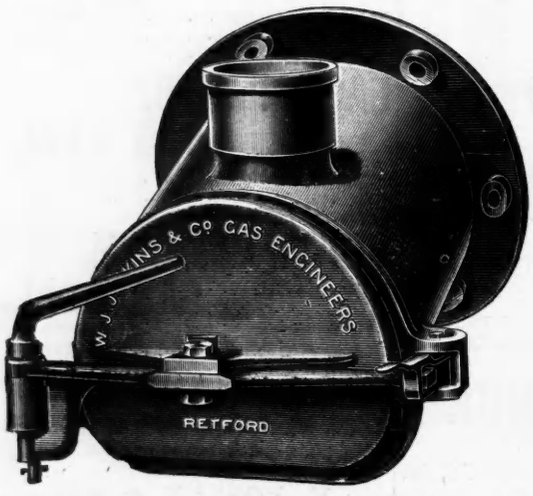


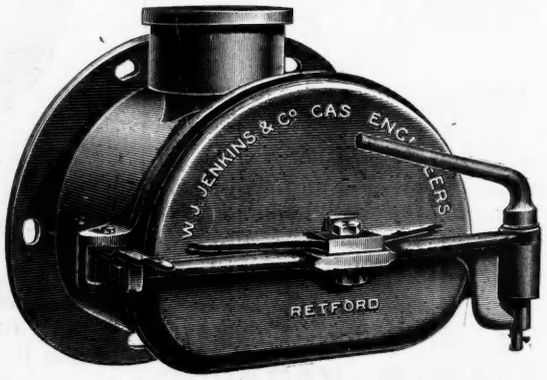


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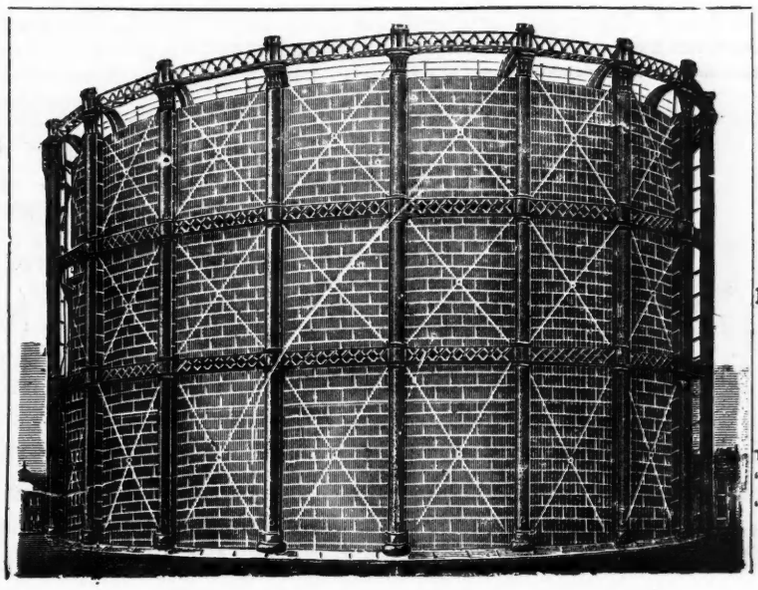

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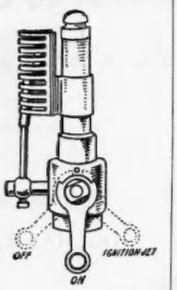


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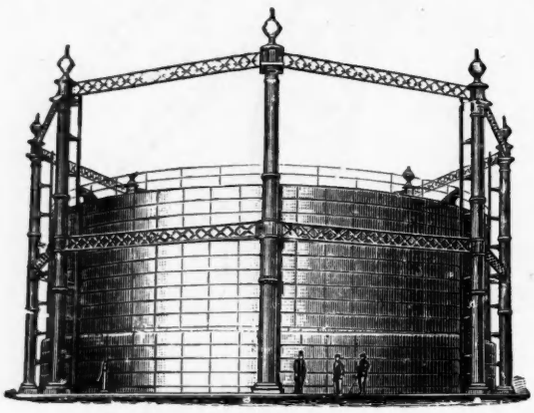

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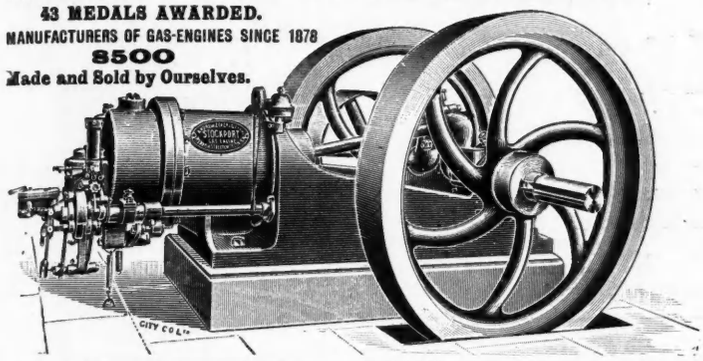

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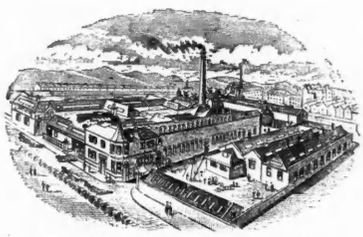

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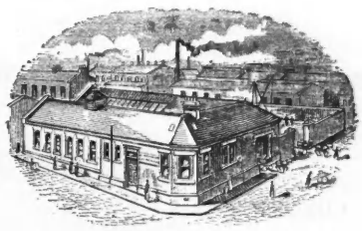

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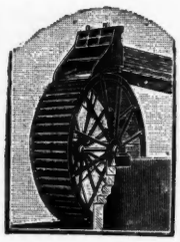

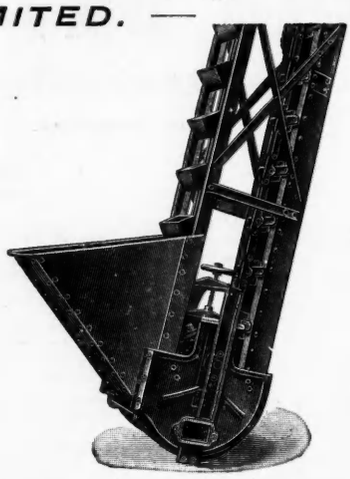

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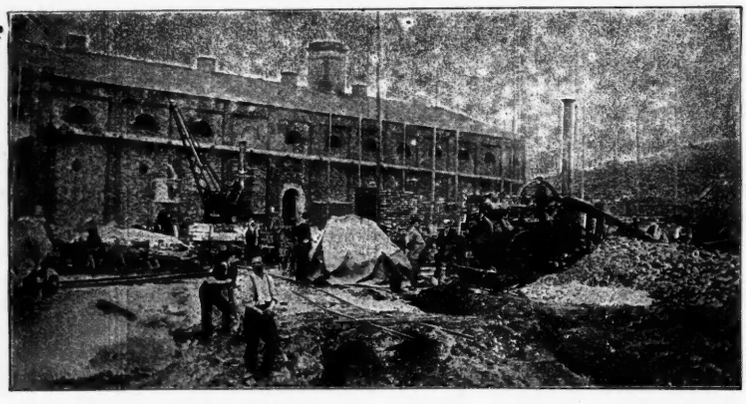

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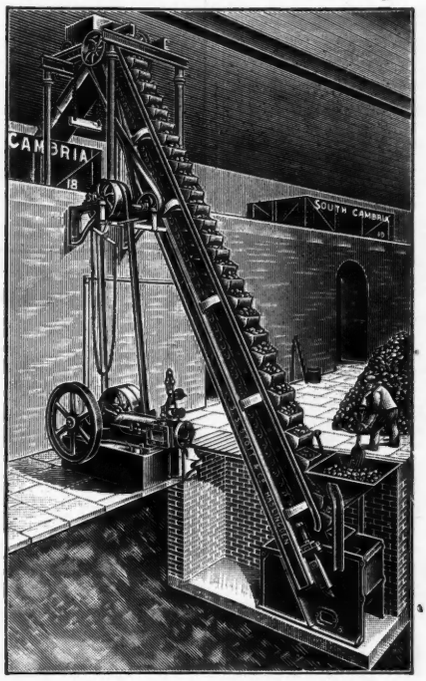


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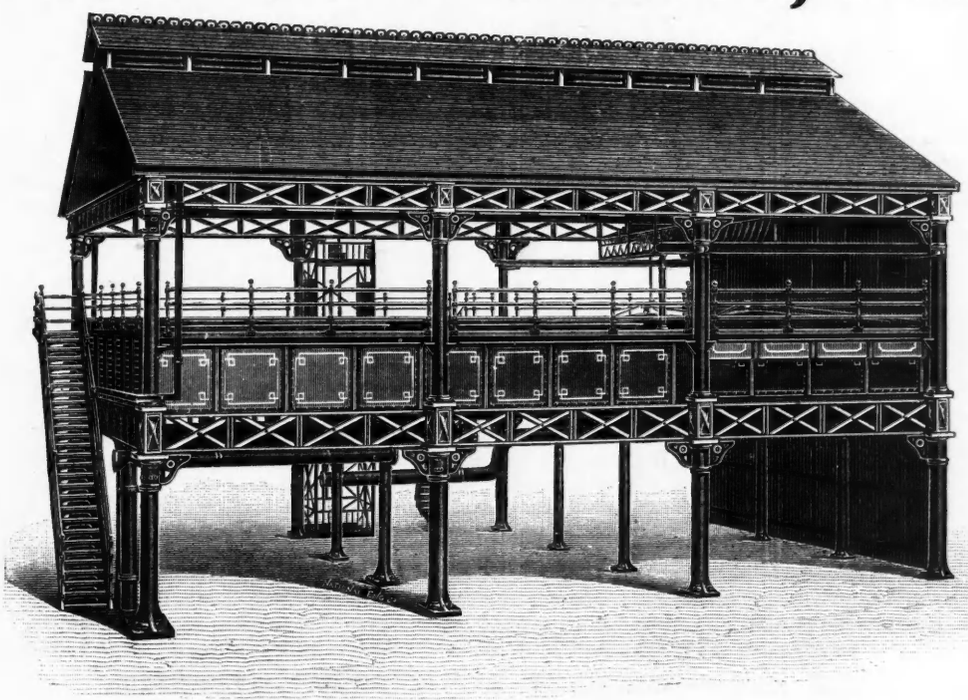

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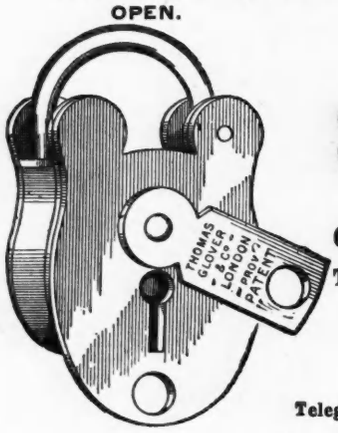


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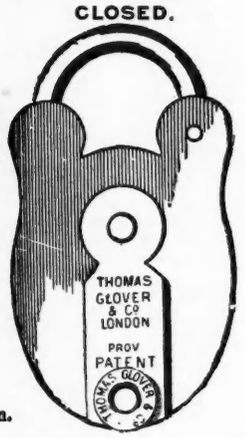


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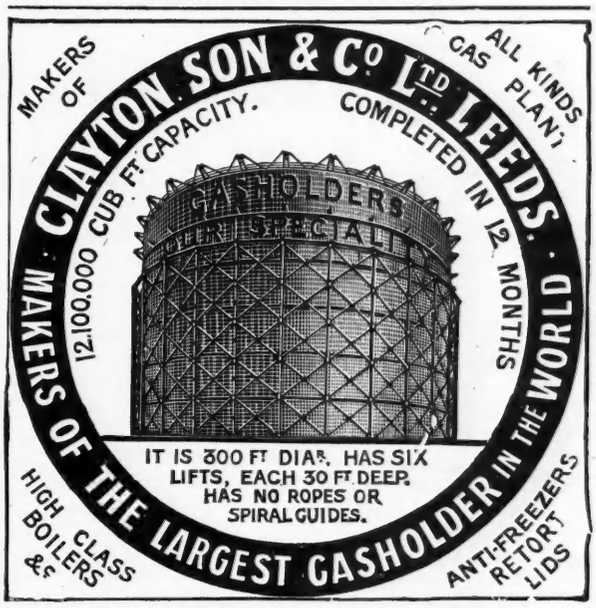
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[See also Advt., p. 338.

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